



HUMAN ANATOMY  
DOUBLE DISSECTION METHOD

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SECOND DISSECTION



# HUMAN ANATOMY

DOUBLE DISSECTION METHOD

BY

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SECOND DISSECTION



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## FOREWORD

The experience of the first dissection, amplified by histological studies, should furnish students with a good working knowledge of all the larger structures and organs of the human body, but as more or less disassociated structures. This preparation allows them to approach study of the *nervous* and *vascular systems* as the interrelating media whereby their knowledge of the integral parts of the body is so coordinated as to enable them to gain full appreciation of the body as a living and physiological unit. The details and continuity of the nervous and vascular systems comprise the most difficult part in the course of Anatomy and are more easily learned after familiarity with the larger structures has been attained. Also, *relationships* between structures are better understood after students have acquired familiarity with all the major parts located in the different regions.

Because the students are confronted from this point on, with more difficult and intricate work, they may well feel that they are entering an advanced phase of study; the value of what has already been accomplished as a preliminary step, however, will be realized more and more as the work proceeds.

If it was important to study directly from the body tissues during the first dissection, it is doubly so in the second dissection. Word descriptions of relationships cannot be retained by memory; attempts to do so are little more than waste of time and effort. Consequently frequent sketches are arranged for in the notes of the second dissection, in place of the written synopses called for in the first. Sketches showing the continuity of nerves and blood vessels are strongly recommended also.

It may be observed that the dissection follows a different regional sequence, the purpose being to maintain as closely as possible the natural continuity of the various systems; also, owing to the complexity involved in the structures of the head and neck, it has been considered advisable to start the second dissection in that region immediately after the preliminary study of that part. Its structures offer an excellent opportunity to modify the rapid and gross dissecting technic used by the students on the first cadaver, to the careful, painstaking effort necessary for the work to follow.

Atlases should be used with the laboratory notes as much as in the former dissection, in order to identify the position of a structure before trying to expose it; otherwise the progress of the students will be retarded, and the nerves or vessels are liable to be cut or injured so as to interfere with the best opportunity for study.

Few details are so important as to call for more than a fair share of time. If a student encounters difficulty in exposing a structure mentioned in one paragraph, after reasonable effort he should check that paragraph as unfinished and pass to the next; the structure may be disclosed in the subsequent steps of dissection; if not, the help of an instructor should be requested.

Students should not fail to review their previous studies of the larger structures as the work proceeds.



The following instruments are recommended in addition to the regular dissecting equipment:

Bone chisel,  $\frac{1}{4}$  or  $\frac{5}{16}$  inch

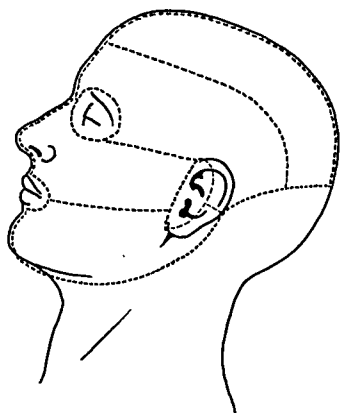
Mallet

Gigli saws and handles

Don't use a *knife* more than necessary. In the exposure of blood vessels and nerves, better results will be accomplished by "blunt dissection," which is a much safer and more efficient method.

*Keep the field of dissection moist at all times.*

LABORATORY PROCEDURE  
SECOND DISSECTION



I  
SUPERFICIAL FACE

A. TOPICS FOR DISCUSSION. Technic for dissection of Blood vessels and Nerves. Blunt dissection.

B. SPECIAL STUDY

*Nerves:* Facialis (VII) } superficial branches  
          Trigeminus (V) }

*Arteries:* Temporalis superficialis and branches  
          Maxillaris externa and branches

*Veins:* Temporalis superficialis  
          Facialis anterior and branches  
          Facialis posterior

Glandula parotis

C. DIRECTIONS FOR DISSECTION AND STUDY

- ☐ 1. a. Mark out the lines for skin incisions of face and scalp as shown in the diagram. The line from the chin to the mastoid process should run one-half inch below the margin of the mandible.  
      b. Make skin incisions carefully and only of skin depth.  
      c. Reflect the skin from the face and anterior two-thirds of the scalp.\*
- ☐ 2. Locate the Supraorbital Notch or Foramen, to identify and trace the Supraorbital Nerve and Artery.
- ☐ 3. Also locate the Supratrochlear Nerve tracing it toward the scalp.
- ☐ 4. Identify the Frontal Artery and Vein in the forehead and trace their course from the scalp to the root of the nose.
- ☐ 5. Observe the rich blood supply contained in the dense superficial fascia of the scalp. Identify the superficial veins, noting their free anastomoses and trace laterally to their convergence upon the Superficial Temporal Vein. Follow the latter to the upper border of the Parotid Gland.
- ☐ 6. Similarly, identify the superficial arteries within the dissected area of the scalp and trace their convergence upon the Superficial Temporal Artery.
- ☐ 7. At the upper pole of the Parotid Gland, immediately anterior to the external ear, locate the Auriculotemporal Nerve, and follow its major branches into the temporal area. Note its position to the Superficial Temporal Artery and Vein.

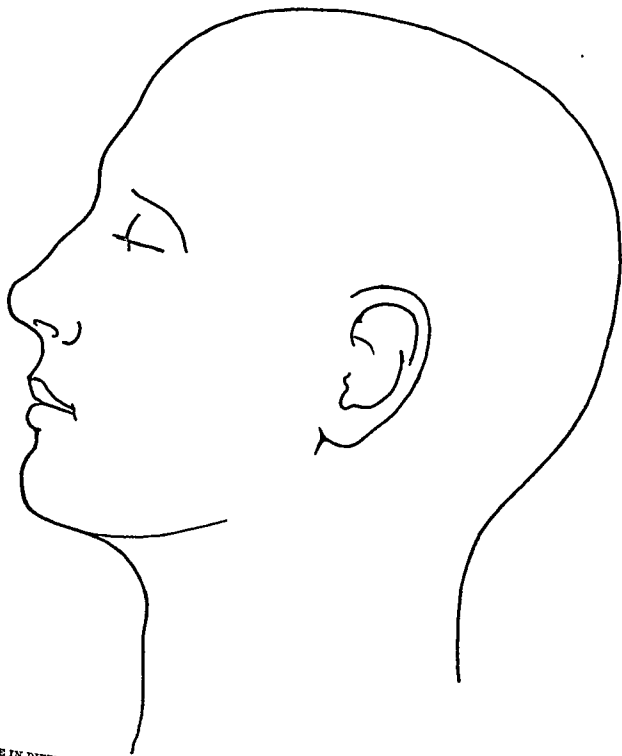
\* Removal of the skin of the neck (Par. 1 and 2, Chapter II) may be done at this time by the partner.

- ☐ 8. Clear away the superficial fascia over Parotid area, then starting immediately in front of the ear, dissect up the Parotid Fascia reflecting it forward. Be careful, as the anterior border of the gland is approached, to avoid cutting branches of the Facial Nerve.
- ☐ 9. Continue the dissection forward to lift the Platysma level of facial muscles as far as the Malar bone, exercising great care not to injure subjacent nerves and vessels.
- ☐ 10. Before proceeding further with the dissection, locate with the help of an atlas, the position of the following structures in relation to the anterior border of the gland:
  - a. Temporal branches of Facial Nerve
  - b. Zygomatic branches of the Facial Nerve
  - c. Transverse Facial Artery and Vein
  - d. Buccal branches of the Facial Nerve
  - e. Parotid (Stenson's) Duct
  - f. Mandibular branch of the Facial Nerve
  - g. Cervical branch of the Facial Nerve
- ☐ 11. Trace the Zygomatic branches of the blood vessels and of the Facial Nerve toward the margin of the Orbit.
- ☐ 12. Note the position of the Transverse Facial Artery and Vein to the Zygomatic Arch as they are traced forward.
- ☐ 13. Identify the relationships of Parotid Duct to the Zygomatic Arch as it is followed across the Masseter muscle (one finger's breadth below the Arch).
- ☐ 14. Note the position of the Buccal Branch of the Facial Nerve to the Parotid Duct.
- ☐ 15. Make an opening in the Parotid Duct where it bends inwardly toward the mouth, and insert a small probe to identify the position of its opening within the mouth opposite the upper second molar tooth.
- ☐ 16. Trace the Mandibular Branch of the Facial Nerve observing its position to the lower border of the Mandible. What is its relation to the External Maxillary Artery and Anterior Facial Vein? Also to the margin of the mandible?
- ☐ 17. Identify the Cervical Branch of the Facial Nerve, but do not trace for the present.
- ☐ 18. Follow the course and note the relations of the External Maxillary Artery and Anterior Facial Vein from the border of the Mandible upward. Observe the very tortuous course of the former.
- ☐ 19. Identify the branches of the External Maxillary Artery and their destination, as its course is followed to the bridge of the nose.

- ☐ 20. Similarly, identify the branches of the Anterior Facial Vein, noting anastomoses with branches of the Superficial Temporal Vein.
- ☐ 21. Identify the Deep Facial Vein. It is important because it drains deeply into the Pterygoid Plexus which communicates with the intracranial Cavernous Sinus.
- ☐ 22. Note the union of the Supraorbital and Frontal Veins to form the Angular Vein. A branch from the latter anastomoses with the Superior Ophthalmic Vein to drain into the Cavernous Sinus.
- ☐ 23. Lift the Quadratus Labii Superiori muscle and the lower border of the Orbicularis Oculi to locate and trace the Infraorbital Nerve and Vessels emerging from the Infraorbital Foramen.
- ☐ 24. Locate and trace the Infratrochlear Nerve from the root of the nose. Also locate the External Nasal Nerve from the Nasociliary branch of the Trigeminal nerve.
- ☐ 25. Try to locate deeply the Buccinator Nerve emerging from under the anterior border of the Masseter muscle.
- ☐ 26. Review the following superficial branches of the Trigeminal Nerve.
  - a. Supraorbital
  - b. Supratrochlear
  - c. Infraorbital
  - d. Infratrochlear
  - e. Auriculotemporal
  - f. Buccinator
  - g. External Nasal
- ☐ 27. The following communications between the Facial Nerve and the Trigeminal Nerves may be looked for:
  - a. Temporal branches of the Facial with Zygomaticotemporal Branch (Trigeminus), beneath the Orbicularis Oculi on the Temporal Fascia.
  - b. The Zygomatic branches (Facial) with Zygomaticofacial Branch (Trigeminus), upon the Zygomatic arch.
  - c. The Buccal branches (Facial) with the Infraorbital Nerve (Trigeminus), beneath the infraorbital head of the Quadratus.
  - d. The Buccal branches (Facial) with the Buccinator Nerve (Trigeminus), near the anterior margin of the Masseter muscle.
  - e. The Mandibular branch (Facial) with the Mental branch (Trigeminus), beneath the muscles of the lower lip.

Review the superficial muscles of the face and scalp.

Review the Frontal and Nasal bones.



SHADE IN DIFFERENT COLORS THE SENSORY AREAS, AND INDICATE THE COURSE OF THE NERVES

## SUPERFICIAL NECK, ANTERIOR

A. TOPICS FOR DISCUSSION. General considerations of the Blood vessels, Nerves, Lymph drainage. Deep Venous Anastomoses (Cavernous Sinus).

### B. SPECIAL STUDY

*Nerves:* Plexus cervicalis—cutaneous branches  
 Facialis (VII)—cervical branches

*Artery:* Maxillaris externa

*Veins:* Jugularis externa  
 Jugularis anterior  
 Arcus venosus  
 Facialis anterior  
 Facialis posterior  
 Facialis communis  
 Auricularis posterior

### C. DIRECTIONS FOR DISSECTION AND STUDY

Place a block under the shoulders.

- ☐ 1. a. Make an incision of the skin only, from the tip of the chin to about one inch below the upper end of the Sternum.  
 b. Carry incision laterally, one and one-half inches below the border of the Clavicle, to the tip of each shoulder.
- ☐ 2. Carefully dissect up the skin from the anterior and lateral sides of the neck within this area, exposing the superficial fascia and Platysma muscle.
- ☐ 3. By blunt dissection of fatty tissue in the clavicular portion of this area, try to identify the distal branches of the Anterior and Middle Supraclavicular Nerves emerging through the fibers of the Platysma Muscle; also the Posterior Supraclavicular branches passing over the border of the Trapezius muscle.
- ☐ 4. In a similar manner within the upper half of this region, try to identify the superficial terminal branches of the Cervical Cutaneous Nerves, also emerging through the Platysma.
- ☐ 5. From the lower pole of the Parotid Gland trace the Cervical Branch of the Facial Nerve to its entry under the Platysma muscle. Try to identify its branch of communication with the Cutaneous Cervical Nerves lying on the Sternocleidomastoid muscle.



- ☐ 6. Identify the lateral border of the Platysma muscle and carefully reflect it medially to expose the superficial nerves and vessels located in the fatty tissue beneath. The muscle may be cut transversely to enlarge the exposure.
- ☐ 7. Trace the Cervical Cutaneous Nerves medially from the posterior border of the Sternocleidomastoid muscle.
- ☐ 8. Identify the deeper portions of the Supraclavicular Nerves to the point of their emergence from the posterior border of the Sternocleidomastoid muscle.
- ☐ 9. Expose the upper portion of the Anterior Jugular Vein in this deeper portion of the superficial fascia. Also, uncover the course of the External Jugular Vein.

Note: A great range of variation will be observed in the pattern of superficial veins.

- ☐ 10. Identify and expose the cervical portion of the Anterior Facial Vein.
- ☐ 11. Identify the Great Auricular Nerve near the mid-point of the posterior border of the Sternocleidomastoid and trace upward within the exposed field. Also try to locate the Lesser Occipital Nerve.
- ☐ 12. Identify the Posterior Auricular Vein at its junction with the External Jugular Vein.
- ☐ 13. Spatium Suprasternale (Burns' Space). This space is formed by separation of the *superficial* division of the Cervical Fascia into two layers. It extends from the Sternum upward to nearly the level of the Cricoid Cartilage, and transversely between the medial borders of the Sternocleidomastoid muscles.
- ☐ 14. Cut the anterior layer of this Fascia along the upper border of the Sternum, and upward along the inner margins of the Sternocleidomastoid muscle for about one and one-half inches.
- ☐ 15. Clean out the areolar tissue from this space to expose the deeper layer of this Fascia. Note its attachment to the posterior surface of the Manubrium just above the origins of the Infrahyoid muscles. Identify, if present, the Arcus Venosus, and the relation of the Anterior Jugular Veins to this space.
- ☐ 16. Observe the attachment of deep fascia (Cervical) to the Hyoid bone, definitely separating the spaces occupied by the Supra and Infrahyoid muscles.
- ☐ 17. Above the Hyoid bone, the deep fascia divides to form two layers. The superficial layer attaches to the lower border of the Mandible. The deeper layer lies in contact with the Myohyoid muscle and is attached with that muscle to the Myohyoid Line of the Mandible.

- 18. Carefully incise the outer layer of deep fascia along the border of the mandible and reflect to identify (but do not disturb) the more superficial contents of this space:

- a. External Maxillary Artery
- b. Anterior Facial Vein
- c. Submaxillary Gland
- d. Lymph glands

The deeper structures will be exposed in subsequent dissection.

- 19. List and give the origins of the Cutaneous Nerves of the Neck.



SKETCH THE COURSE OF THE CUTANEOUS NERVES OF THE NECK;  
ALSO THE ARTERIES OF THE FACE AND NECK

## ANTERIOR TRIANGLES OF THE NECK

The present phase in the dissection of the neck is primarily for *topographic* purpose. The structures are to be identified in relation to the triangular areas in which they lie. Do not cut or distort unduly the muscular boundaries or contents of these triangles until the present topographic studies are completed.

If identification of a deep structure proves to be difficult, postpone the search until later when ample opportunity will be given for complete exposure and study.

A. TOPICS FOR DISCUSSION. Topographic significance. Lymphatic drainage of head and neck.

### B. SPECIAL STUDY

Trigonum Musculare and contents

Trigonum Caroticum and contents

### C. DIRECTIONS FOR DISSECTION AND STUDY

#### MUSCULAR TRIANGLE

##### Contents

##### *Nerves*

Supraclaviculares anterior\*

Cutaneous colli\*

Recurrens†

Vagus†

Sympathicus†

##### *Arteries*

Thyroidea superior

Thyroidea inferior

Thyroidea ima (inconstant)

Carotis communis

##### *Veins*

Jugularis anterior\*

Jugularis interna

Thyroidea superior

Thyroidea media

Thyroidea inferior

Glandulas thyroidea

Larynx

Trachea

Parathyroidea†

Oesophagus†

\* Subcutaneous.

† To be exposed later.

- ☐ 1. Identify the borders of the Muscular Triangle.
- ☐ 2. Remove carefully the deep fascia covering this triangle in order to identify and preserve the muscular branches from the Pars Descendens of the Ansa Hypoglossi, that supply the infrahyoid muscles.

- ☐ 3. Isolate the anterior belly of the Omohyoid muscle to identify its nerve supply from the Ansa Hypoglossi. Also note its source of blood supply.
- ☐ 4. Divide the Sternohyoid muscle as low as possible and reflect upward. In doing so, identify its nerve supply from the Ansa Hypoglossi, and its blood supply.
- ☐ 5. Similarly, identify the nerve and blood supply to the Sternothyroid muscle.
- ☐ 6. Divide the Sternothyroid as low as possible, preserving its vascular and nerve connections.
- ☐ 7. Reflect the Sternothyroid muscle upward and identify the External Branch of the Superior Laryngeal Nerve which lies under this muscle. It supplies the Cricothyroid muscle of the Larynx, and helps to supply the Inferior Constrictor of the Pharynx.
- ☐ 8. Identify the underlying or second division of Deep Cervical Fascia, as the Pretracheal Fascia.
- ☐ 9. Retract the lower portion of the Sternocleidomastoid muscle, exposing the lateral border of the Thyroid Gland.
- ☐ 10. Locate the Superior Thyroid Artery and Vein entering the upper pole of the gland.
- ☐ 11. At the lower pole, identify the Inferior Thyroid Vein.
- ☐ 12. Is a Thyroid Ima Artery present? As only a part of it would be visible at this time, make a note of its origin and course from textbook.
- ☐ 13. Lift the lateral margin of the gland and locate the Inferior Thyroid Artery and the Middle Thyroid Vein, noting their relation to the Carotid Sheath.
- ☐ 14. Identify the Carotid Sheath, and review its continuity with the Pretracheal and Prevertebral Fasciae in a cross-section diagram. Split the Carotid Sheath. Identify its contents and make note of their positions to each other.
- ☐ 15. Study the relations of the Thyroid Gland in position.

CAROTID TRIANGLE

Contents

*Nerves*

Cutaneus colli*	Laryngeus superior
Ramus colli (N. Facialis)*	(R. Internus)
Ansa Hypoglossi	Vagus (X)
(Pars descendens)	Accessorius (XI)†
Hypoglossus (XII)	Sympathicus†

*Arteries*

Carotis communis	Carotis interna
Carotis externa	Lingualis
Maxillaris externa	Pharyngeus ascendens†
Thyroidea superior	Occipitalis
Laryngea superior	

*Veins*

Facialis communis	Jugularis interna
Lingualis	Thyroidea superior

Lymphoglandulae cervicales

\* Subcutaneous.

† To be exposed later.

- ☐ 16. Identify the borders of the Carotid Triangle.
- ☐ 17. Trace the Anterior Facial Vein to its union with the Posterior Facial, to form the Common Facial Vein. Follow the latter to its juncture with the Internal Jugular Vein.
- ☐ 18. Remove fat and connective tissue from the Triangle observing the presence of lymph glands adjacent to the large vessels.
- ☐ 19. Identify the Lingual Vein of the Internal Jugular Vein. Trace the course of the Superior Thyroid Vein.
- ☐ 20. Identify the Hypoglossal Nerve (XII) overlying the External and Internal Carotid Arteries near the upper corner of this triangle and follow the Pars Descendens of the Ansa downward. Identify its branch to the Thyrohyoid muscle.  
*Note:* The Ansa Hypoglossi is formed by the Pars Descendens of the Hypoglossus Nerve and the Ramus Communicans from Cervical 2 and 3; the latter will be exposed later.
- ☐ 21. Locate and make note of the position of the bifurcation of the Common Carotid Artery.

- ☐ 22. Trace the course of the Superior Thyroid Artery. It originates below the Hyoid bone, and turns sharply downward after giving off the Superior Laryngeal Branch. (Site for ligation.)

Follow the Superior Thyroid Artery to the border of the Omohyoid; also the course of its Superior Laryngeal Branch, noting its relation to the External Laryngeal branch of the Superior Laryngeal Nerve.

- ☐ 23. Observe the entrance of the Internal Branch (sensory) of the Superior Laryngeal Nerve into the Hyothyroid Membrane to the interior of the Larynx, accompanied by the Superior Laryngeal Artery.

The smaller External Laryngeal Branch passes downward deeply to the Superior Thyroid and Common Carotid Arteries as a motor nerve to the Cricothyroid and Inferior Constrictor muscles.

- ☐ 24. Try to identify the origins of the five branches given off from the External Carotid Artery in the upper corner of this triangle:
- External Maxillary
  - Lingual
  - Ascending Pharyngeal\*
  - Occipital\*
  - Muscular branch to the Sternocleidomastoid.

\* By twisting the External Carotid Artery, locate the origin of the Ascending Pharyngeal Artery with blunt dissection; also the origin of the Occipital Artery.

- ☐ 25. The Accessory Nerve (XI) may be found deeply in the upper corner of this triangle passing from beneath the posterior belly of the Digastric muscle under the anterior border of the Sternocleidomastoid.

Review the Hyoid bone.

# IV ANTERIOR TRIANGLES OF THE NECK (CONTINUED)

## SUBMENTAL TRIANGLE

### Contents

*Nerves:* Terminal cutaneous branches

*Arteries:* Submental, terminal branches

*Veins:* Jugularis Anterior, terminal branches

*Lymphoglandulae.*

## DIRECTIONS FOR DISSECTION AND STUDY

- ☐ 1. Identify the borders of the Submental Triangle.
- ☐ 2. Expose and identify the position of the submental vessels, and try to locate one or two submental lymph glands.

## DIGASTRIC TRIANGLE

### Contents

#### *Nerves*

Marginalis mandibularis(VII)\*

Ramus colli (VII)\*

Cutaneus colli\*

Mylohyoideus

Hypoglossus (XII)

Glossopharyngeus (IX) †

Vagus (X) †

Accessorius (XI) †

#### *Arteries*

Submental\*

Maxillaris externa

Mylohyoidea

Carotis externa

Lingualis

#### *Veins*

Facialis anterior\*

Submental\*

Lingualis

Facialis posterior

Glandula submaxillaris

Glandula parotis (lower tip)

Lymphoglandulae

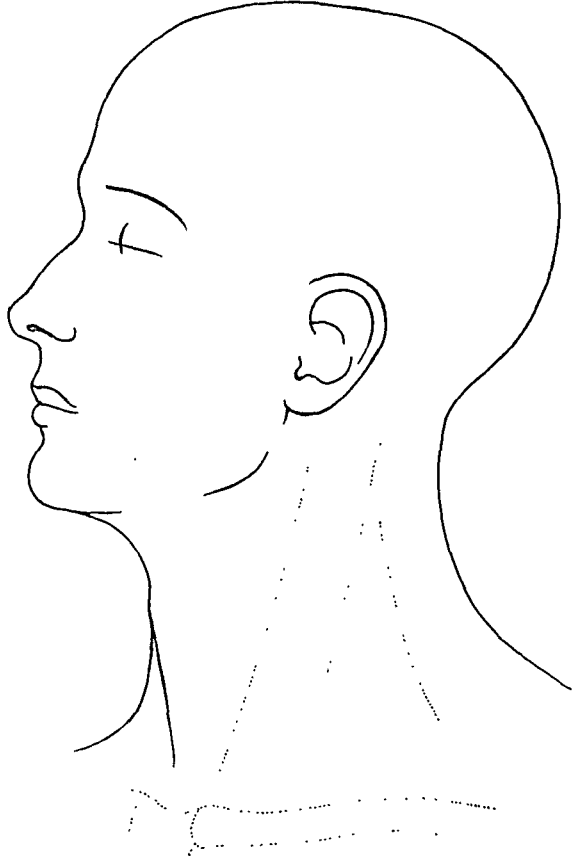
\* Subcutaneous.

† To be exposed later.

## DIRECTIONS FOR DISSECTION AND STUDY

- ☐ 3. Identify the borders of the Digastric Triangle.
- ☐ 4. Make note of the position of the Anterior Facial Vein and External Maxillary Artery to the Submaxillary Gland.





SKETCH THE MUSCULAR BOUNDARIES OF THE ANTERIOR AND POSTERIOR TRIANGLES  
OF THE NECK; ALSO THE VEINS OF THE FACE AND NECK

- ☐ 5. Raise the Submaxillary Gland and identify its blood supply from the External Maxillary Artery.
- ☐ 6. Remove the fat from this area carefully to observe the entrance of the Mylohyoid Artery and the Digastric branch of the Mylohyoid Nerve into the anterior belly of the Digastric muscle, about mid-point on its posterior border.
- ☐ 7. Locate and expose the muscular branch to the Mylohyoid muscle.
- ☐ 8. Observe that the floor of this triangle is formed (anterior four-fifths) by the Mylohyoid muscle; the posterior portion, by the Hyoglossus muscle.
- ☐ 9. In the posterior corner of the triangle, the Hypoglossal Nerve and Lingual Vein lie superficial to the Hyoglossus muscle, then dip under the Mylohyoid.  
Expose their course by cutting the second layer of deep fascia and the Mylohyoid muscle just above the Hyoid bone.
- ☐ 10. The Lingual Artery is exposed by cutting carefully through the Hyoglossus muscle along the Hyoid bone and reflecting it upward.
- ☐ 11. Note the relative position of the Stylohyoid and posterior belly of the Digastric muscle to each other.

.....  
Position of the External Maxillary Artery to these muscles.

.....  
Position of the Posterior Facial Vein to the muscles and to the Parotid Gland.

- ☐ 12. Locate the proximal portion of the Hypoglossal Nerve under cover of the Stylohyoid and Digastric muscles. Note its relation to the External and Internal Carotid Arteries and Internal Jugular Vein.

.....  
.....  
Exposure and tracing of the deeper structures (the Glossopharyngeal, Vagus and Accessory Nerves, and Lingual Artery) will be deferred for later dissection.

Make sketches on page 290 of the Anterior Triangles of the Neck showing their borders and position of their contents.



v

## POSTERIOR TRIANGLES OF THE NECK

### A. SPECIAL STUDY

Trigonum Occipitale and contents.

Trigonum Omohyoideum and contents.

### B. DIRECTIONS FOR DISSECTION AND STUDY

#### OCCIPITAL TRIANGLE

##### Contents

##### *Nerves*

Supraclaviculares\*

Auricularis magnus\*

Occipitalis minor\*

Accessorius

Plexus cervicalis

(muscular branches)

Plexus brachialis

##### *Arteries*

Transversa colli

Cervicalis superficialis

Occipitalis (occasionally)

##### *Veins*

Auricularis posterior

R. Profundus (Jugularis Ext.)

Transversa colli

##### *Lymphoglandulae*

\* Subcutaneous.

Prop body in a half-sitting position.

- ☐ 1. Identify the boundaries of the Occipital Triangle.
- ☐ 2. Reflect skin of the scalp in the postaural region to uncover the anterior part of the Trapezius attachment to the skull. Clearly expose the posterior belly of the Omohyoid muscle; note its innervation from the Ansa Hypoglossi.
- ☐ 3. Identify the Posterior Auricular Branch of the External Jugular Vein and note its course.
- ☐ 4. Locate the proximal portions of the Great Auricular and Lesser Occipital Nerves about the middle of the posterior border of the Sternocleidomastoid and trace them to the ear and scalp.
- ☐ 5. Try to locate the Occipital Artery in the upper corner of this triangle.
- ☐ 6. Clear away the fascia covering this triangle. Carefully avoid injury to underlying structures, and preserve or review, the more superficial Supraclavicular nerves.



- ☐ 7. Pay special attention to the position and course of the Accessory Nerve within this triangle. (Important surgically.)
- ☐ 8. Note and preserve the nerve branches of the Cervical and Brachial Plexuses.
- ☐ 9. Identify the Deep branch of the External Jugular Vein; also expose and identify the Superficial Cervical and Transverse Cervical Arteries.

OMOHYOID TRIANGLE (Subclavian)

Contents

*Nerves*

Supraclaviculares\*  
Subclavius

Plexus brachialis  
Thoracales anteriores†

*Arteries*

Subclavia  
Transversa colli

Transversa scapulae

*Veins*

Jugularis externa  
Subclavia

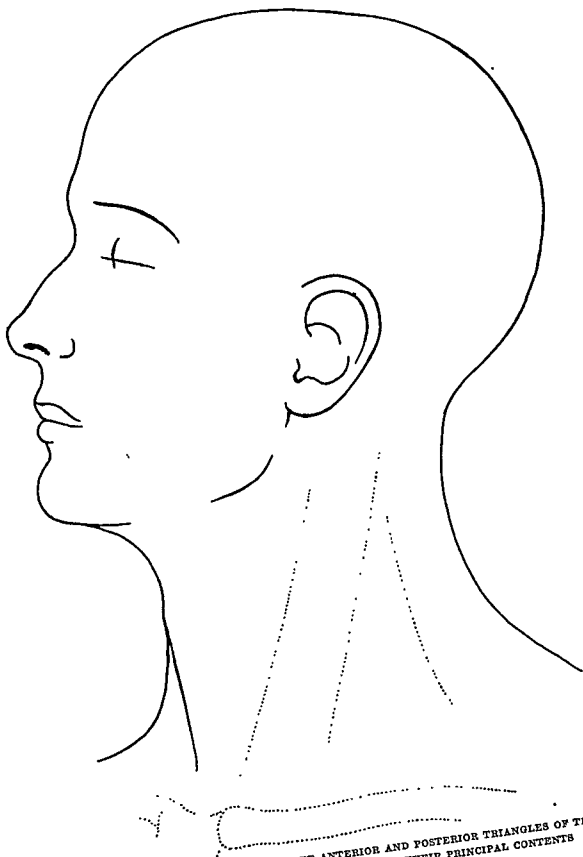
Transversa colli  
Transversa scapulae

\* Subcutaneous

† To be exposed later.

- ☐ 10. Identify the borders of the Subclavian Triangle.
- ☐ 11. Identify the local branches of the External Jugular Vein and the union of the latter with the Subclavian Vein.
- ☐ 12. Carefully remove areolar tissue to identify and preserve the small nerve to the Subclavius muscle from the Brachial Plexus.
- ☐ 13. Pull aside the veins to identify the Subclavian Artery and the origin of the Transverse Cervical Artery. Sometimes the Subclavian Artery lies behind the clavicle, below the area of the Triangle.
- ☐ 14. Trace the Transverse Cervical Artery to its bifurcation into Ascending and Descending branches.
- ☐ 15. Identify the Transverse Scapular Artery. It often lies behind the Clavicle below the triangle.
- ☐ 16. Note presence of the underlying Brachial Plexus. Its dissection will be undertaken later.

Add sketches of the Posterior Triangles of the Neck, on page 290 showing their borders, and position of their contents.



INDICATE THE POSITION OF THE ANTERIOR AND POSTERIOR TRIANGLES OF THE  
NECK, AND LIST BY NAME, OR SKETCH IN, THEIR PRINCIPAL CONTENTS

# VI STERNOCLEIDOMASTOID REGION

A. TOPICS FOR DISCUSSION. Continuity and relationships of Cervical vessels and nerves.

## B. SPECIAL STUDY

<i>Nerves:</i> Ansa hypoglossi	Cardiac
Phrenicus	Recurrens
Vagus	Plexus cervicalis
Sympathicus	Plexus brachialis

*Arteries:* Carotides and branches  
Subclavia and branches

*Veins:* Jugulares and branches  
Subclavia and branches  
Vertebralis

Lymphoglandulae cervicales  
Ductus thoracicus  
Ductus lymphaticus dexter

## C. DIRECTIONS FOR DISSECTION AND STUDY

- ☐ 1. Review the superficial veins of the neck and remove them, including the External Jugular Vein.
- ☐ 2. Cut the Sternocleidomastoid from its attachment on the Sternum and Clavicle; carefully reflect it upward, identifying its blood and nerve supply in doing so.
- ☐ 3. Blood supply of Sternocleidomastoid, three sources:
  - \* Upper .....
  - Middle .....
  - Lower .....
- ☐ 4. Nerve supply of Sternocleidomastoid:
  - .....
- ☐ 5. Review cross-section study of the neck, especially for the relationships of deeper cervical structures and their position to the layers of Cervical Fascia.



- ☐ 6. Carefully dissect away the remaining superficial portions of the Carotid Sheath, identifying and tracing the Communicating Branch of the Ansa Hypoglossi to Cervicales 2 and 3; also observe the presence and distribution of Lymph Nodes along the course of the large vessels.
- ☐ 7. Review and make a sketch of the branches of the Internal Jugular Vein.
- ☐ 8. On the left side, identify the Thoracic Duct and its point of drainage into the Venous System at the juncture of the Internal Jugular and Subclavian Veins. Make specific notations of its relation to adjacent structures.

*Note:* In the cadaver, the Thoracic Duct is often filled with blood and can easily be mistaken for a vein.

- ☐ 9. On the right side, the Right Lymphatic Duct has a similar point of drainage. What are its tributaries?

.....  
 .....  
 .....

- ☐ 10. Locate, and trace the cervical course of the Vagus Nerve in relation to the Internal Jugular Vein and the Carotid Arteries. Dissect carefully to avoid injury to the *Superior and Inferior Cardiac Branches*.
- ☐ 11. Completely expose the Common Carotid Artery and its External and Internal branches. Note the position of the bifurcation on right and left sides to the Hyoid bone:

Right..... Left.....

- ☐ 12. Review the branches of the Aortic Arch and of the Superior Vena Cava for their continuity with the vessels of the Neck.
- ☐ 13. Cut the Internal Jugular Vein a half inch above its juncture with the Subclavian Vein and reflect upward.
- ☐ 14. Cut the Clavicle between its middle and outer thirds and disarticulate the medial portion downward. Review its Sternoclavicular joint and ligaments.
- ☐ 15. Identify the Subclavian Vein and its relation to the First rib and Anterior Scalenus muscle. Also identify the Vertebral Vein on each side.
- ☐ 16. Expose the Subclavian Artery and note its relation to the First rib and Anterior Scalenus muscle. Its three parts are recognized in relation to the Anterior Scalenus as I, medial to it; II, behind it; and III, lateral to it.
- ☐ 17. Identify the origin of the three branches on Part I·
  - a. Vertebral
  - b. Thyrocervical Trunk
  - c. Internal Mammary

- ☐ 18. Note that the Vertebral Artery dips deeply between the Anterior Scalenus and Longus Colli muscles to run upward within the Transverse Processes of the Sixth and upper Cervical Vertebrae to enter the cranial cavity by the Foramen Magnum (refer to skeleton).
- ☐ 19. Identify the branches of the Thyrocervical trunk:
- Transverse Scapular
  - Superficial Cervical
  - Ascending Cervical
  - Inferior Thyroid
  - Transverse Cervical, may originate from the Thyrocervical Trunk or Subclavian Artery (Part II).
- ☐ 20. Trace the Transverse Scapular Artery to the border of the Trapezius.
- ☐ 21. The Superficial Cervical Artery sometimes has a common origin with the Ascending Cervical. Note the course of the latter.
- ☐ 22. Trace from its origin the Inferior Thyroid Artery to its entrance into the Thyroid Gland, observing its course beneath the Carotid Sheath. Note its branches to the Trachea and Oesophagus.
- ☐ 23. Identify the Phrenic Nerve lying upon the Anterior Scalenus and trace toward its Cervical roots.

The relations of the Phrenic Nerve on each side are:

Right.....

.....

Left.....

.....

- ☐ 24. Carefully raise the Common Carotid Artery by blunt dissection in order to avoid injury to the small Cardiac Nerves. Identify the Sympathetic Trunk and its Middle and Lower Ganglia:

Middle Ganglion, level of the Inferior Thyroid Artery. Level, C6.

Lower Ganglion, about the level of the Subclavian Artery. Frequently it unites with the First Thoracic Ganglion to form the Stellate Ganglion. Level, T1.

The Upper Ganglion lies beneath the Internal Carotid Artery toward the base of the skull.

- ☐ 25. Compare the positions of the External and Internal Carotid Arteries along their course. Observe the absence of branches from the Internal Carotid although occasionally the Superior Thyroid Artery may originate from this artery instead of the External Carotid.

- ☐ 26. In the lower area locate and trace the Recurrent Nerve, and identify its termination as the Inferior Laryngeal Nerve. (Surgical Note: Part of the nerve may pass through the substance of the Thyroid Gland.)
- ☐ 27. Make cross-section sketches of the neck at (1) the Hyoid, and (2) mid-thyroid levels, showing the relationship of the blood vessels and nerves to each other and to adjacent structures. (See pages 434-435.)
- ☐ 28. Develop the continuity of the nerves and blood vessels which have been observed in the Anterior and Posterior Triangles of the Neck.

Sketch the Cervical Plexus showing distribution of its anterior and posterior branches.

Review the Mandible and the Temporal Bone.

# RETROMANDIBULAR AND TEMPORAL REGIONS

## A. TOPIC FOR DISCUSSION. The Facial Nerve.

## B. SPECIAL STUDY

*Nerves:* Facialis (VII)

Plexus parotideus

R. Auricularis nervi vagi

*Arteries:* Carotis externa

Maxillaris interna and branches

• *Veins:* Facialis posterior

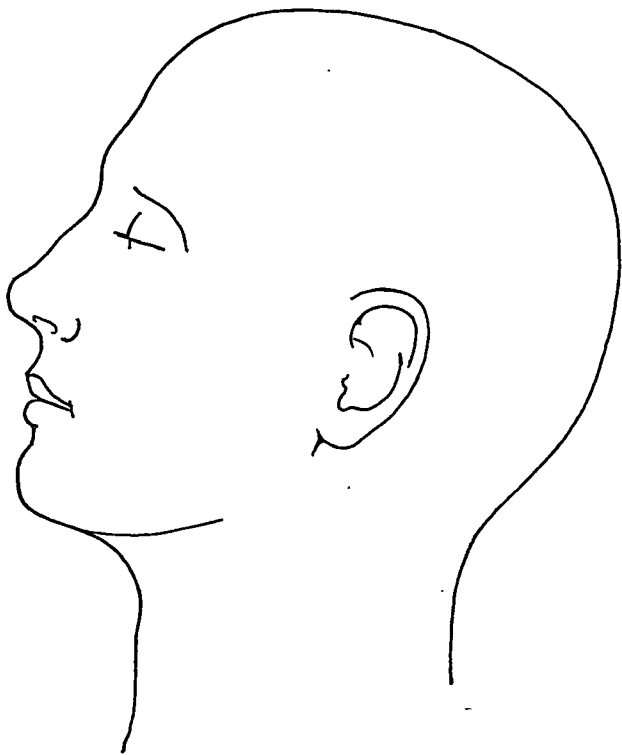
Maxillaris interna and branches

Temporalis media

## C. DIRECTIONS FOR DISSECTION AND STUDY

- ☐ 1. Carefully break away piecemeal the substance of the Parotid Gland to follow the deeper course of the Facial Nerve toward its exit from the Stylomastoid Foramen, identifying the portion called the "Parotid Plexus." (Read next paragraph.)
- ☐ 2. In making this dissection, try to identify and expose the following:
  - a. Origin of the small nerves to the Stylohyoid and posterior belly of the Digastric.
  - b. Anastomotic Branch between the Facial and Auriculotemporal Nerves.
  - c. The Posterior Auricular Nerve from the Facial (a, to the Occipitalis muscle; and b, to the ear); also, the adjacent Posterior Auricular Artery from the External Carotid.
  - d. Auricular Branch of the Vagus Nerve entering the posterior surface of the External Meatus, after having joined the auricular branch of the Posterior Auricular Nerve.

*Note:* Irritation of this branch causes coughing or swallowing reflex.
- ☐ 3. Review the exposed parts of the Facial Nerve including the distribution and anastomoses of all its extracranial branches.
- ☐ 4. Expose the Posterior Facial Vein, preserving the Transverse Facial and Zygomatic branches of the Superficial Temporal Artery passing forward superficially to it.
- ☐ 5. Identify the Internal Maxillary Vein, a branch dipping deeply to drain the Pterygoid Plexus.
- ☐ 6. Expose the bifurcation of the External Carotid to form the Internal Maxillary and Superficial Temporal Arteries.



- ☐ 7. Trace upward from the neck the course of the **External Carotid Artery**, reviewing the origins of the following branches:
 

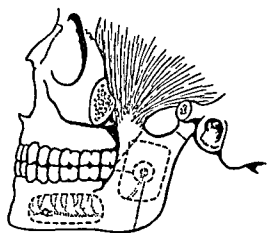
a. Superior Thyroid	e. Occipital
b. Lingual	f. Posterior Auricular
c. Ascending Pharyngeal	g. Internal Maxillary
d. External Maxillary	h. Superficial Temporal
- ☐ 8. Trace the **Auriculotemporal Nerve**, noting its relation to the **Superficial Temporal Artery and Vein**, just above the upper level of the ear.
- ☐ 9. Cut the superficial layer of **Temporal Fascia** along the upper border of the **Zygomatic Arch** and upward along the posterior margin of the **Zygomatic bone**.

Reflect the fascia upward noting the presence of fat between the layers and its line of fusion with the deeper layer.

- ☐ 10. Identify in this space the **Orbital branch** of the **Superficial Temporal Vein** and the **Zygomaticotemporal branch** of the **Trigeminal Nerve (V)**.
- ☐ 11. Cut the deeper layer of **Temporal Fascia** along the medial border of the **Zygoma** and reflect.
- ☐ 12. Identify and trace the **Middle Temporal Artery and Vein** from the **Superficial Temporal Artery and Vein**.

Review the **Maxilla** and **Zygomatic bone**; also the **Temporomandibular Joint**.

Make a diagrammatic sketch of the branches of the **External Carotid Artery**.



VIII  
MANDIBLE AND INFRATEMPORAL FOSSA

A. TOPIC FOR DISCUSSION. The Trigeminal Nerve.

B. SPECIAL STUDY

*Nerves:* Trigeminal (V) and branches

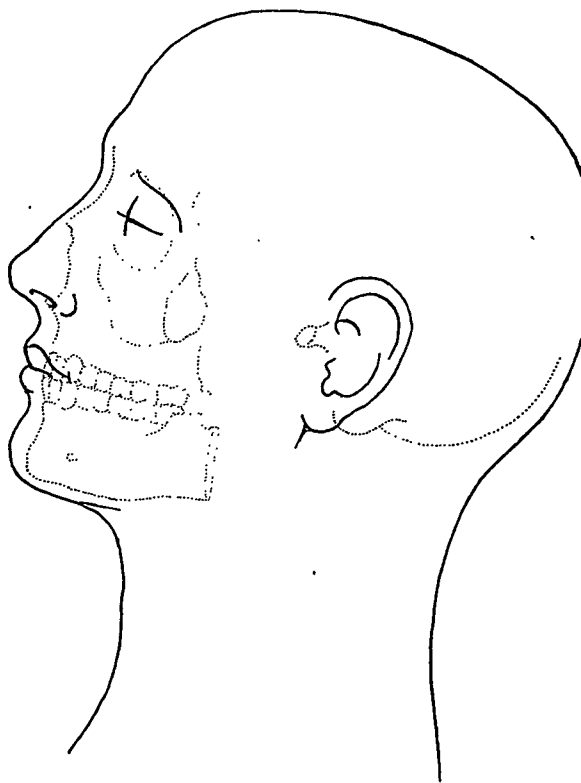
*Arteries:* Maxillaris interna and branches

*Veins:* Maxillaris interna, Plexus pterygoideus

C. DIRECTIONS FOR DISSECTION AND STUDY

- ☐ 1. Dissect up carefully the upper posterior corner of the Masseter muscle to expose the Masseteric Artery, Vein, and Nerve lying on the deeper surface of this muscle. Extend their exposure to follow their course through the Mandibular Notch.
- ☐ 2. Cut away the insertion of the Masseter from the angle of the Mandible, leaving small portions attached to the vessels and nerve for their identification.
- ☐ 3. Locate the Anastomotic Branch of the Anterior Facial Vein and trace it posteriorly toward the Coronoid Process of the Mandible under which it dips to join with the Pterygoid Plexus.
- ☐ 4. Expose the terminal portions of the Buccinator Artery and Nerve.
- ☐ 5. Saw carefully the Zygoma (posteriorly) just in front of the Articular Tubercle; and (anteriorly) at the anterior limit of the Arch, cutting obliquely forward. (See figure on opposite page.)
- ☐ 6. Complete the exposure of the insertion of the Temporal muscle upon the Coronoid Process of the Mandible.
- ☐ 7. Lift the Triangularis muscle from the Mandible to identify the exit of the Mental Nerve and Vessels from the Mental Foramen.
- ☐ 8. Enlarge the Foramen laterally about an inch in order to observe their course within the bone, and the innervation of the teeth.
- ☐ 9. Chisel away the outer plate of the ramus, from the alveolar level toward the Mandibular Notch to expose the more proximal portion of the Inferior Alveolar Nerve, Artery, and Vein. Identify in this field, their medial exit through the Mandibular Foramen in the deeper plate of bone.
- ☐ 10. Carefully saw off the entire Coronoid Process by an oblique cut through the ramus from the Notch to the inner angle of the Mandible. Avoid injury to the underlying structures.





- ☐ 11. Carefully reflect the Temporal muscle upward identifying the entrance of the Anterior and Posterior Deep Temporal Arteries, and the corresponding Deep Temporal Nerves.

Leave small portions of the muscle attached to these structures for identification, and extend the reflection for wide exposure.

- ☐ 12. Identify the exit of the terminal branches of the Zygomaticotemporal Nerve from the small foramen (of the same name) on the temporal surface of the Zygoma.
- ☐ 13. a. Enlarge the Mandibular Foramen without injury to the Alveolar Nerve and vessels; pass a Gigli saw subperiosteally to the inner angle and saw through the anterior half of the ramus.  
b. Similarly, saw downward toward the inferior border of the Mandible in front of its angle.  
c. Pass the saw under the neck of the Mandible against the lower margin of the External Pterygoid muscle, dividing the bone at this level. Remove the fragment.
- ☐ 14. Relocate the Internal Maxillary, Inferior Alveolar, and Anastomotic Facial Veins as this area is prepared for study, identifying the Pterygoid Plexus upon which they (and the Deep Temporal Veins) converge.
- ☐ 15. Continue the dissection sufficiently to identify the Internal Maxillary Artery and observe its position in relation to the Temporal and Pterygoid muscles.
- ☐ 16. Slightly anterior to the Inferior Alveolar Nerve, locate the Lingual Nerve but do not proceed further with its exposure at present.
- ☐ 17. Study the External and Internal Pterygoid muscles, especially as to their relation with the nerves and blood vessels in the region.
- ☐ 18. Make a sketch of all the branches of the Mandibular division of the Trigeminal Nerve.

Review the Sphenoid bone.



I X  
INFRATEMPORAL FOSSA (COMPLETED)

A. TOPIC FOR DISCUSSION. The Internal Maxillary Vessels.

B. SPECIAL STUDY

*Nerves:* Mandibularis and branches

*Arteries:* Maxillaris interna and branches  
Carotis interna

*Veins:* Maxillaris interna and branches

C. DIRECTIONS FOR DISSECTION AND STUDY

- ☐ 1. Carefully disarticulate the articular process of the Mandible and remove it with the External Pterygoid Muscle.
- ☐ 2. Identify the three parts of the **Internal Maxillary Artery**; Mandibular, Pterygoid and Sphenomaxillary.
- ☐ 3. *Mandibular Portion.* Locate the origins of the following branches:
  - a. Deep Auricular
  - b. Anterior Tympanic
  - c. Middle Meningeal
  - d. Accessory Meningeal
  - e. Inferior Alveolar
- ☐ 4. Make note of the destination of the following Arteries:  
**Deep Auricular Artery** .....  
**Anterior Tympanic Artery** .....
- ☐ 5. Observe the course of the **Middle and Accessory Meningeal Arteries** and note their destination.  
**Middle Meningeal Artery** .....  
**Accessory Meningeal Artery** .....
- ☐ 6. Trace the **Inferior Alveolar Artery and Nerve** toward the Mandible, noting that each gives off a Mylohyoid branch just before entering the Mandibular Foramen.

Review the Mylohyoid Nerve and Artery within the Digastric Triangle. This nerve is the *motor* portion of the Inferior Alveolar Nerve, and innervates the Mylohyoid muscle and the anterior belly of the Digastric.

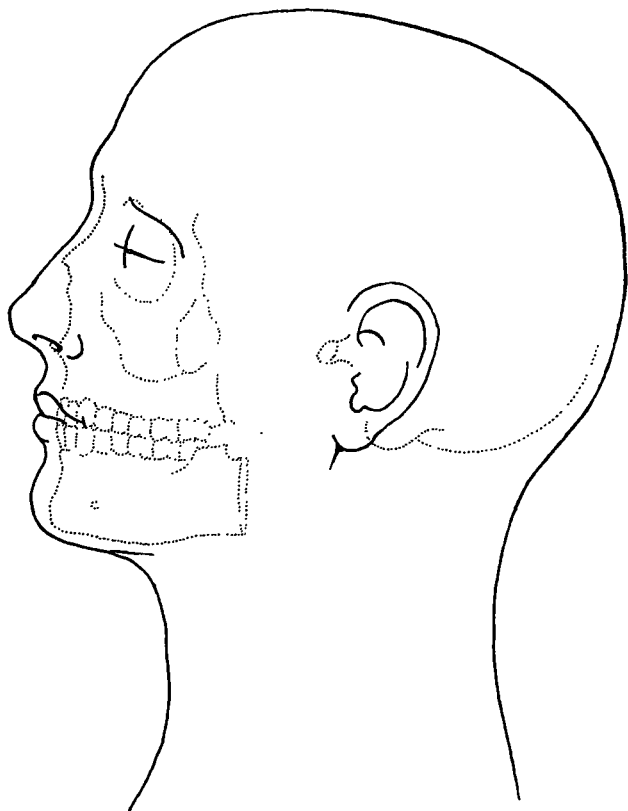
- ☐ 7. *Pterygoid Portion.* Identify the origin of the following branches:
  - a. Masseteric
  - b. Buccinator
  - c. Deep Temporal, Posterior and Anterior
  - d. Pterygoids (to External and Internal)
- ☐ 8. Trace the **Buccinator Artery**, noting its parallel course with the **Buccinator Nerve** which emerges between the two heads of the **External Pterygoid muscle**.
- ☐ 9. Review the **Anterior and Posterior Deep Temporal Arteries and Nerves**, and identify the blood and nerve supply of the **Pterygoid muscles**.
- ☐ 10. *Sphenomaxillary Portion.* The branches of the Third Part are:
  - a. Posterior Superior Alveolar
  - b. Infra-orbital\*
  - c. Descending Palatine\*
  - d. Vidian (A. Canalis Pterygoidei)\*
  - e. Sphenopalatine\*

\* Not to be traced at present.

- ☐ 11. Follow the course of the **Posterior Superior Alveolar Artery**, noting branches that enter the **Maxillary bone** for the teeth.
- ☐ 12. Observe the subsequent dipping of the **Internal Maxillary Artery** toward the **Pterygopalatine Fossa**. Its other branches will be studied later.
- ☐ 13. Identify the emergence of the **Infraorbital Artery** from the **Infraorbital Foramen**.
- ☐ 14. Trace the **Inferior Alveolar, Lingual,\* Buccinator and Deep Temporal Nerves** to their union to form (with the **Auriculotemporal**), the **Mandibular Division of the Trigeminal Nerve (V)** at its exit through the **Foramen Ovale**.

\* Try to identify the union of the **Chorda Tympani** with the **Lingual Nerve** when making this dissection.

- ☐ 15. Follow the **Middle Meningeal Artery** toward its passage between the two roots of the **Auriculotemporal Nerve**. It enters the skull through the **Foramen Spinosum** accompanied by the **Small Spinosus Nerve** from the **Mandibular trunk**. What is the destination of the latter?
- ☐ 16. From its superficial portion, trace the **Auriculotemporal Nerve** under the **Temporal vessels** to its two separate roots from the **Mandibular Nerve**.



- ☐ 17. Note the nature (Motor or Sensory) of the branches of the Mandibular Nerve:
- Inferior Alveolar . . . . .
- Lingual . . . . .
- Buccinator . . . . .
- Deep Temporal . . . . .
- Auriculotemporal . . . . .
- Spinous . . . . .
- ☐ 18. Make a sketch of the Internal Maxillary Artery and its branches. Also, show in a sketch the routes of communication between the Cavernous Sinus and the veins of the face.

Review the Occipital and Parietal bones.

X  
SUBMASTOID REGION

A. TOPICS FOR DISCUSSION. Blood supply and Venous drainage of the Cranial Cavity.

B. SPECIAL STUDY

<i>Nerves:</i> Accessorius	Hypoglossus
Glossopharyngeus	
Vagus	

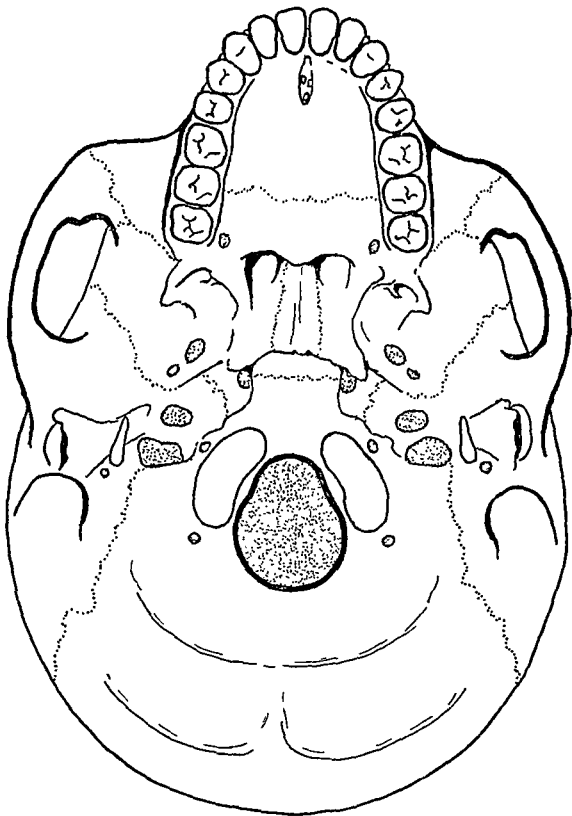
<i>Arteries:</i> Occipitalis	Vertebralis
Carotis interna	

*Veins:* Jugularis interna

C. DIRECTIONS FOR DISSECTION AND STUDY

- ☐ 1. Review the course of the Accessory Nerve in relation to the Sternocleidomastoid muscle and to the Occipital Triangle.
- ☐ 2. After reviewing the Sternocleidomastoid muscle, its blood supply and innervation by the Accessory Nerve and branches from Cervicales 2 and 3, cut it from the Mastoid process.  
Preserve the exposed Cervical Nerves, their loops and branches within the dissected area. The Cervical Plexus as a unit will be studied later.
- ☐ 3. a. Detach the Splenius Capitis and Longissimus Capitis from their insertion on the skull.  
b. Carefully chisel away the Mastoid Process, including the origin of the posterior belly of the Digastric muscle on its medial surface (Mastoid Notch), as far as the groove containing the Occipital Artery.
- ☐ 4. Trace the exposed course of the Occipital Artery from its origin to the Occipital Groove on the Temporal bone. Note the relationships of this proximal portion.  
.....  
.....  
.....
- ☐ 5. Trace the trunk of the Facial Nerve deeply to its exit from the Stylomastoid Foramen.
- ☐ 6. Locate the Styloid Process and the origin of the three muscles. Stylohyoid, Stylopharyngeus, and Styloglossus.





INDICATE THE POINT OF ENTRANCE OF ALL ARTERIES SUPPLYING  
THE STRUCTURES WITHIN THE SKULL

- ☐ 7. Locate the **Glossopharyngeal Nerve** and make note of its course in relation to these muscles. Also, try to identify the small **Ascending Palatine Artery** from the **External Maxillary**.
- ☐ 8. With care not to injure the soft structures, cut or break the **Styloid Process** at its base with its muscles attached.
- ☐ 9. Trace by blunt dissection the following structures toward the **Jugular Foramen**:
  - a. **Accessory Nerve**
  - b. **Internal Jugular Vein**
  - c. **Vagus Nerve**
  - d. **Glossopharyngeal Nerve**
- ☐ 10. Follow the **Internal Carotid Artery** from its origin as far as possible toward its entrance into the **Carotid Canal**.
- ☐ 11. Trace the **Hypoglossal Nerve** as deeply as possible toward the **Hypoglossal Canal**. Make note of its relationships.  
.....  
.....  
.....  
.....
- ☐ 12. Try to trace the **Ascending Pharyngeal Artery** from its origin on the **External Carotid**, to the base of the skull.  
What is its destination?
- ☐ 13. Try to locate the **Superior Cervical Ganglion** as the origin of the **Sympathetic Trunk**.
- ☐ 14. Review on a skeleton the course of the **Vertebral Artery** from its **Subclavian** origin to its cranial entrance through the **Foramen Magnum**. Make notation of its relationships. It will be dissected later.  
.....  
.....  
.....

On the sketch of the base of the Skull, indicate the structures which pass through each of the foramina.

Review the **Palatine bone**.



X I  
P O S T E R I O R   N E C K

A. TOPICS FOR DISCUSSION. Posterior Cervical Relationships.

B. SPECIAL STUDY

*Nerves:* Plexus cervicalis posterior and branches

*Arteries:*

Occipitalis	Cervicalis profunda
Vertebralis	

*Veins:*

Occipitalis	Cervicalis profunda
Vertebralis	

Trigonum Suboccipitale

C. DIRECTIONS FOR DISSECTION AND STUDY. Cadaver face downward with a block under the thorax.

- ☐ 1. a. Make a medial skin incision from scalp to the level of the spines of the Scapulae.  
b. Dissect away the skin from the posterior scalp, neck, and upper back.  

*Note:* Be careful not to injure the superficial nerves and vessels in the coarse connective tissue of the back of the neck.
- ☐ 2. Locate the Greater Occipital Nerve emerging through deep fascia near the upper margin of the Trapezius and trace its general distribution in the superficial fascia of the Scalp.
- ☐ 3. Observe the distribution of the superficial branches of the Occipital Vein. What forms the Suboccipital Venous Plexus?
- ☐ 4. In the upper cervical area, identify the cutaneous branches of the Third Occipital Nerve, the posterior prolongation of Cervical 3; follow its upward course toward the scalp.
- ☐ 5. Cleanly expose the surface of the Trapezius locating and tracing the *transverse* course of one or more of the Cutaneous Posterior Branches of the Lower Cervical and Upper Thoracic Nerves.
- ☐ 6. Cut the insertion of the Trapezius as necessary, in order to follow the terminal course of the Occipital Artery to its distribution in the scalp. Try to identify the origins of its deeper Meningeal branches (to the Jugular and Mastoid Foramina), and of its Descending branch.

- ☐ 7. Detach the Trapezius from the Occipital bone and reflect downward cutting its attachment to the Vertebral spines. Identify its innervation by the Accessory Nerve and by the Cervicales 3 and 4. Also, its blood supply from the Ascending branch of the Transverse Cervical Artery.
- ☐ 8. Preserving the Greater Occipital Nerve, reflect the Splenius downward noting its innervation from the Posterior Rami of the Cervical Nerves. Also reflect the Longissimus which has been cut from the Mastoid Process.
- ☐ 9. Trace the Descending Branch of the Occipital Artery and identify its superficial and deep portions. The latter has anastomoses with the Vertebral and Deep Cervical Arteries. (Collateral circulation after ligation of the Common Carotid or Subclavian Arteries.)
- ☐ 10. Detach the Semispinalis from the Occipital bone and reflect downward noting its innervation by the Suboccipital and Greater Occipital Nerves. Locate the deeper portion of the Cervical Nerve 3.
- ☐ 11. Locate the underlying Deep Cervical Artery and Vein.

The Artery originates from . . . . .

- ☐ 12. Trace the Deep Cervical Artery's anastomoses with the Descending branch of the Occipital Artery and with the Vertebral Arteries.
- ☐ 13. Try to identify the anastomosis between the Deep Cervical Vein and the Occipital Vein.

The Deep Cervical Vein drains into . . . . .

#### "POSTERIOR CERVICAL PLEXUS"

- ☐ 14. Study the posterior branches of the Cervical Nerves 1, 2, 3, and 4 and their connecting loops. Make a sketch of them.

#### SUBOCCIPITAL TRIANGLE

##### *Contents*

*Nerves:* Occipitalis major\*

Suboccipitalis (C<sub>1</sub>)

*Artery:* Vertebralis

*Vein:* Vertebralis

\* In roof of Triangle.

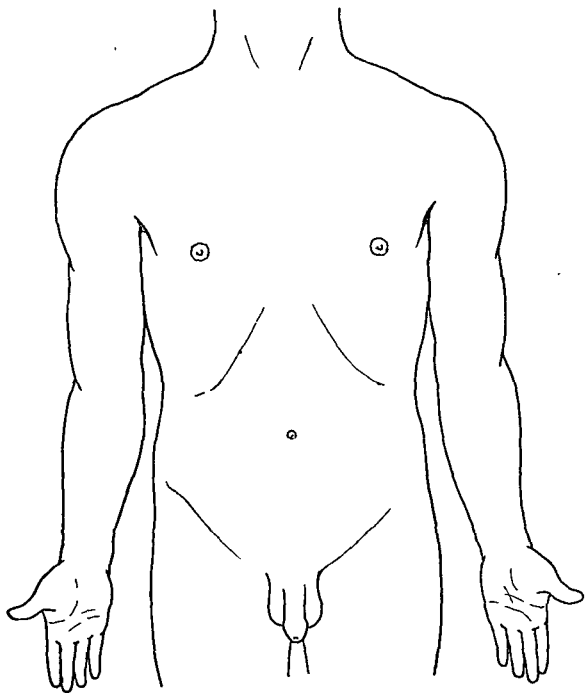
- ☐ 15. Expose and identify the muscles forming the boundaries of the Suboccipital Triangle, noting their innervation by the Suboccipital Nerve.
- ☐ 16. Carefully clear away the connective tissue within the triangle to expose the Vertebral Artery and its relation to the Atlas.
- ☐ 17. Try to locate the origin of the Vertebral Vein.

- ☐ 18. On one side remove the Suboccipital muscles to identify the course of the Vertebral Artery in this area, and note how it enters the skull.
- ☐ 19. Locate the Mastoid Foramen and identify the Mastoid Emissary Vein connecting with the Occipital, or with the Posterior Auricular Vein; note the accompanying Mastoid Meningeal branch of the Occipital Artery which enters the bone with this vein.

Make a sketch of the Suboccipital Triangle and its adjacent Structures.

Review the Cervical Vertebrae.

Prepare the neck and head for temporary suspension of work in these regions.



INDICATE SENSORY AREAS OF THE CHEST AND UPPER ARM; LATER ADD THE CUTANEOUS  
INNERVATION OF THE ABDOMINAL WALL; SKETCH THE COURSE OF THE NERVES

X I I  
PECTORAL REGION AND AXILLA

A. TOPICS FOR DISCUSSION. Visceral topography. Female Breast.

B. SPECIAL STUDY

*Nerves:*

Intercostales thoracales (cutaneous branches)  
Thoracales anteriores (lateralis and medialis)  
Thoracalis longus

*Arteries:*

Subclavia, and branches  
Axillaris

*Veins:*

Subclavia  
Axillaris

Mammae

C. DIRECTIONS FOR DISSECTION AND STUDY

- ☐ 1. a. Incise the skin along the mid-sternal line to the tip of the Xiphoid Process, then laterally to the posterior Axillary line.  
b. Make a circular incision of the skin at the margin of the Areola of the breast.  
c. From the tip of the shoulder, incise the skin down the lateral aspect of the arm to an inch below the insertion of the Deltoid then transversely across the medial aspect of the arm.
- ☐ 2. Dissect *only* the skin from the anterior chest wall, breast, shoulder, and the anterior and medial aspects of the arm.
- ☐ 3. Review the terminal branches of the Supraclavicular nerves, then locate and trace\* two or more of the costosternal and lateral cutaneous branches of the Intercostal Nerves. Note the adjacent emergence of subcutaneous arteries and veins.

\* Before doing this, make a diagrammatic sketch of the course and branches of an Intercostal Nerve as seen in cross section of the body following the plane of one of the middle ribs.

FEMALE BREAST

- ☐ 4. In the Female Breast, note the extent of the Areola and the presence of Areolar glands. While removing the skin, identify fibrous extensions into breast tissue (Cooper's ligaments). They cause a dimpled appearance of the skin when involved in cancerous conditions; or, a retraction of the nipple due to their greater development in the central portion of the breast.



- ☐ 5. Section the Breast through the Nipple and identify the Lactiferous Tubules. Make other parallel sections observing the location and distribution of breast tissue (Lobules).

- ☐ 6. Describe briefly the blood supply of the Breast.

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- ☐ 7. Briefly describe the Lymphatic drainage of the Breast and location of its Lymph glands. (Important surgically.)

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- ☐ 8. On the lateral side of the chest wall, about the level of the nipple, identify and trace two of the Lateral Cutaneous branches of the Intercostal Nerves emerging from between the digitations of the Serratus Anterior muscle, into the superficial fascia lateral to the border of the Pectoralis Major.

- ☐ 9. Locate and trace the Second Intercostal Nerve (Intercostobrachial) which does not divide into anterior and posterior branches, but follows the posterior border of the Axilla onto the medial side of the arm where it communicates with the Medial Brachial Cutaneous Nerve.

(Clinical Note: On the left side, this nerve carries referred pain down the medial aspect of the arm in Angina Pectoris.)

Sometimes the Third Intercostal has a similar distribution to the arm. Expose its course.

- ☐ 10. Follow the course of the Medial Brachial Cutaneous Nerve in the superficial fascia of the Arm.

- ☐ 11. Remove Breast tissue and superficial fascia from the area between the mid-sternal line and the lateral border of the Pectoralis Major muscle, identifying below the Clavicle the Cephalic Vein emerging from the Deltoideopectoral Triangle with the Deltoid branch of the Thoracoacromial Artery.

- ☐ 12. Being careful not to destroy any nerves or vascular structures, remove the superficial fascia and fat from the lateral chest wall, medial side of the arm, and Axilla. Observe the presence and location of Lymph Nodes.
- ☐ 13. Identify and expose the Lateral Thoracic Vein, a branch of which, the Thoracoepigastric Vein, runs the length of the torso to join with the Superficial Epigastric Vein from the groin.
- ☐ 14. Also trace the Lateral Thoracic Artery supplying the Serratus Anterior and Pectoral muscles, and its External Mammary branch in females. Try to identify the origin on the Axillary Artery.
- ☐ 15. Expose the Long Thoracic Nerve and note its innervation of the Serratus Anterior muscle upon which it lies.
- ☐ 16. Cut the Pectoralis Major from its Clavicular origin and partly reflect it downward. Also cut the lateral end of the Subclavian muscle and reflect it medially preserving its nerve from the Brachial Plexus.
- ☐ 17. Identify the Thoracoacromial Artery piercing the Costocoracoid Membrane, to give off Clavicular, Acromial, Pectoral and Deltoid branches.
- ☐ 18. Locate the Lateral Anterior Thoracic Nerve going to the Pectoralis Major, and to the terminal branches of the Medial Anterior Thoracic Nerve which underlies and perforates the Pectoralis Minor to supply both muscles.
- ☐ 19. Complete the removal of the Pectoralis Major at its origin and reflect laterally, preserving its blood and nerve supply, or retaining attached portions of the muscle for their identification.
- ☐ 20. Review the Clavipectoral Fascia (Coracoclavicular). Its attachments are:  
Above: to the anterior and posterior margins of the Clavicle (enclosing the Subclavius)  
Medially: to the Thoracic wall  
Below: to the Axillary Fascia  
Laterally: to the Arm  
It envelops the Subclavius and Pectoralis Minor muscles. Its continuation between these muscles is called the "Costocoracoid Membrane."
- ☐ 21. Cut the Clavipectoral Fascia and the Pectoralis Minor near its Coracoid insertion. Reflect the muscle carefully, identifying and preserving its innervation by the Medial Anterior Thoracic Nerve.
- ☐ 22. Remove adjacent connective tissue to expose clearly the Axillary Vein and the Axillary Artery behind it, and their continuity with the Subclavian vessels.
- ☐ 23. Identify the union of the Cephalic Vein with the Axillary Vein, observing the course of the former on the shoulder and upper arm in relation to the Deltoid muscle.



- ☐ 24. Locate the Costocervical Trunk from the second part of the Subclavian Artery and identify its two branches, Deep Cervical and Highest Intercostal Arteries. Make note of their course and anastomoses.

Deep Cervical Artery .....

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Highest Intercostal Artery .....

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- ☐ 25. The Axillary Artery is divided into three parts by the borders of the Pectoralis Minor muscle. The numerical designation of each part conforms with the number of branches given off:

Part I Superior Thoracic

Part II { Thoracoacromial ,  
          { Lateral Thoracic

Part III { Subscapular  
          { Posterior Humeral Circumflex  
          { Anterior Humeral Circumflex

- ☐ 26. Locate the origin of the Superior Thoracic Artery. Make a note of its course and anastomoses.

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- ☐ 27. Locate the origin of the Thoracoacromial Artery. List its branches and note anastomoses.

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- ☐ 28. Trace the Lateral Thoracic Artery and note its anastomoses.

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- ☐ 29. Locate the origins of the Subscapular, and of the Posterior and Anterior Humeral Circumflex Arteries.



- ☐ 30. Make a sketch of the Subclavian and Axillary Arteries, indicating how they are subdivided, and showing the origin of branches from each division.

Make a similar sketch of the most important branches of the Subclavian and Axillary Veins.

Study, and write a brief description of, the Female Breast. Include blood and nerve supply; also the lymphatic drainage in detail. (Important.)



## CERVICAL AND BRACHIAL PLEXUSES

A. TOPICS FOR DISCUSSION. Composition of Spinal Nerves. Anterior and Posterior Divisions of the Cervical Nerves.

B. SPECIAL STUDY

Plexus Cervicalis

Plexus Brachialis

(Roots, Trunks, Divisions and Cords)

C. DIRECTIONS FOR DISSECTION AND STUDY

CERVICAL PLEXUS

- ☐ 1. The *anterior* divisions of the Cervical Nerves (1), 2, 3, and 4 give origin to the Cervical Plexus. Locate them on the anterior surface of the Levator Scapulae and Scalenus Medius.
- ☐ 2. Identify these cervical roots by retracing to their origin—
  - a. The Phrenic Nerve; from C<sub>4</sub> and C<sub>3</sub> (with a filament from C<sub>5</sub> directly, or through the Subclavian Nerve).
  - b. The Communicating Ramus of the Ansa Hypoglossi; from C<sub>3</sub> and C<sub>2</sub>.
- ☐ 3. Identify the origins of the following nerves which form the superficial portion of this Plexus and make notations of their destination and communications:

Lesser Occipital C<sub>2</sub>, (3).....

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.....

Great Auricular C<sub>2</sub>, 3.....

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.....

Cutaneous Cervical C<sub>2</sub>, 3.....

.....



Supraclaviculars C<sub>3</sub>, 4.....  
 .....  
 .....

- ☐ 4. The *deep* branches have important associations and should be identified and traced as far as possible.
- C<sub>1</sub> to the Hypoglossal Nerve (continued as Pars Descendens of the Ansa).
  - C<sub>2</sub>, 3 Ramus Communicans of the Ansa Hypoglossi.
  - C(3), 4, (5) Phrenic Nerve. (3 and 5 variable.)
  - C<sub>2</sub>, 3 Ramus Communicans to the Accessory Nerve.
  - Muscular Branches
    - C<sub>1</sub>, 2 Recti Capitis
    - C<sub>1</sub>, 2, 3 Longus Capitis
    - C<sub>2</sub> Sternocleidomastoid
    - C<sub>3</sub>, 4 Trapezius, Levator Scapulae and Middle Scalenus

- ☐ 5. Make notes on the relations of the Phrenic Nerve in the neck, and of its ultimate distribution.
- .....  
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 .....

- ☐ 6. Make a sketch of the Cervical Plexus in its entirety (page 322), and list the Nerves with which the first four Cervical roots communicate.

C<sub>1</sub>.....

C<sub>2</sub>.....

C<sub>3</sub>.....

C<sub>4</sub>.....

#### BRACHIAL PLEXUS

- ☐ 7. Formed by the anterior divisions of the Cervical Nerves 5, 6, 7, and 8, also Thoracic Nerve 1. Reflect the Anterior Scalenus muscle for exposure.
- ☐ 8. Identify the union of C<sub>5</sub> and 6, and of C<sub>8</sub> and T<sub>1</sub> to form the Upper and Lower Trunks respectively; C<sub>7</sub> alone forms the Middle Trunk. Observe, if present, a branch from C<sub>4</sub> to C<sub>5</sub> and from T<sub>2</sub> to T<sub>1</sub>.

- ☐ 9. More laterally, locate in relation to the Axillary Artery the three Cords, Lateral, Medial and Posterior. Their names correspond to their position to the Artery.

- ☐ 10. Trace each Cord medially to observe its origin.

**Lateral Cord** from anterior divisions of Upper and Middle Trunks (C<sub>5</sub>, 6 plus C<sub>7</sub>)

**Medial Cord** from the anterior division of the Lower Trunk (C<sub>8</sub>, T<sub>1</sub>)

**Posterior Cord** from the posterior divisions of all three Trunks (C<sub>5</sub>, 6 plus C<sub>7</sub> plus C<sub>8</sub>, T<sub>1</sub>)

- ☐ 11. *Supraclavicular Portion.* Locate on the *Roots*, the origins of the following Nerves and give their destination.

Dorsal Scapular C<sub>5</sub>.....

Long Thoracic C<sub>5</sub>, 6, 7.....

Muscular Rami C<sub>5</sub>, 6, 7, 8.....

On *Trunks* (Upper Trunk only)

Subclavian C<sub>5</sub>, 6.....

Suprascapular C<sub>5</sub>, 6.....

On the *Cords*

Lateral Anterior Thoracic C<sub>5</sub>, 6, 7.....

Medial Anterior Thoracic C<sub>8</sub>, T<sub>1</sub>.....

- ☐ 12. *Infraclavicular Portion.* Locate on the Cords, by retracting the Axillary Artery when necessary, the origins of the following Nerves, noting their character, sensory or motor:

On the *Lateral Cord* (C<sub>5</sub>, 6, 7)

Musculo-Cutaneous.....

Median (Lateral origin).....

On the *Medial Cord* (C<sub>8</sub>, T<sub>1</sub>)

Median (medial origin).....

Medial Brachial Cutaneous.....

Medial Antibrachial Cutaneous.....

Ulnar.....



On the *Posterior Cord* (C<sub>5</sub>, 6, 7, 8, T<sub>1</sub>)Upper Subscapular (C<sub>5</sub>, 6).....Lower Subscapular (C<sub>5</sub>, 6).....Axillary (C<sub>5</sub>, 6).....Thoracodorsal (C<sub>5</sub>, 6, 7).....Radial (C<sub>5</sub>, 6, 7, 8, T<sub>1</sub>).....

- ☐ 13. Follow the course of the Long Thoracic Nerve from its origin to the Axilla. Note its relationships.

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- ☐ 14. Try to identify the small muscular branches to the Scaleni and Longus Colli muscles.

The Dorsal Scapular Nerve will be exposed later.

- ☐ 15. Trace the Subclavian Nerve from its origin. Note if it sends a filament to the Phrenic Nerve.

- ☐ 16. Trace the Suprascapular Nerve to the Suprascapular Notch. Identify its course in relation to the Omohyoid muscle, and to the Transverse Scapular Artery in the region of the Scapular Notch.

- ☐ 17. Trace the Medial and Lateral Anterior Thoracic Nerves from their origins to the Pectoral muscles. Note their relations to the Axillary Artery and the Thoracoacromial Trunk (artery).

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- ☐ 18. From the Lateral Cord, trace the Musculocutaneous Nerve to its entrance into the Coracobrachialis muscle.

- ☐ 19. Follow the lateral root of the Median Nerve to its union with the medial root from the Medial Cord.

- ☐ 20. Trace the Medial Brachial and Antibrachial Cutaneous Nerves from the Medial Cord observing their course within the Axilla in relation to the large vessels.

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- ☐ 21. Identify the position of the **Ulnar Nerve** in relation to the **Axillary Vein** and **Artery**, and to the **Median Nerve**.
- ☐ 22. Review the origins of the following nerves from the **Posterior Cord** and note their destinations:

**Upper Subscapular** . . . . .

**Lower Subscapular** . . . . .

**Thoracodorsal** . . . . .

**Axillary** . . . . .

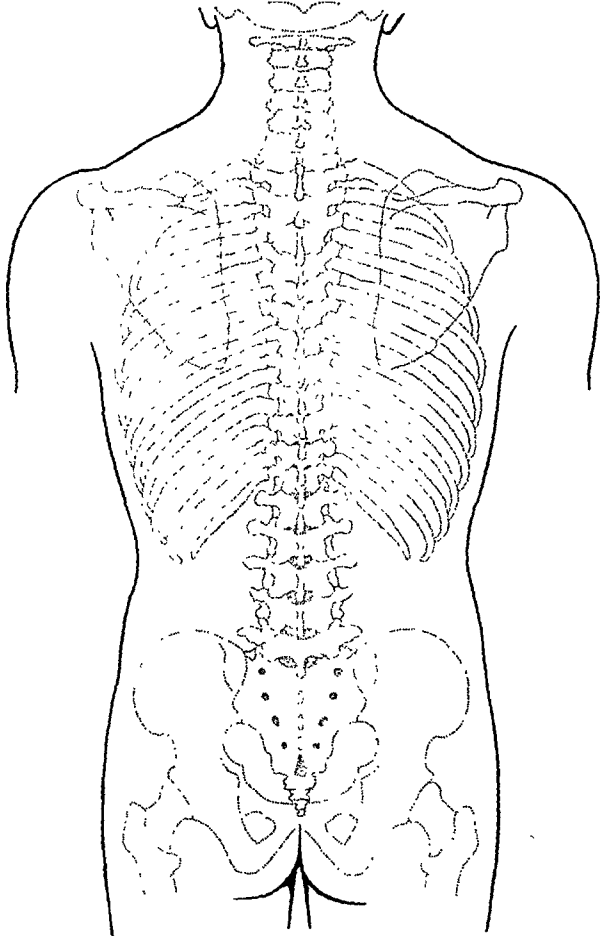
- ☐ 23. Locate the course of the **Radial Nerve** into the **Axilla** and note its relations to adjacent axillary structures.

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Draw a sketch of the **Brachial Plexus** and its branches using individual colors for each **Cervical Root** to distinguish the segmental distribution to each **Cord** and its branches.





SHADE THE SENSORY AREAS AND INDICATE COURSE OF THE NERVES

XIV  
SUPERFICIAL BACK

A. TOPICS FOR DISCUSSION. Spinal Nerves and Their Distribution.

B. SPECIAL STUDY

*Nerves:*

Spinales (Cutaneous branches)

Cervicales

Thoracales

Lumbales

Sacrales

C. DIRECTIONS FOR DISSECTION AND STUDY

Cadaver face downward.

- ☐ 1. a. Make a longitudinal incision of the skin in the mid-line of the back to the middle of the Sacrum.  
b. Vertical incision on each side of the body from the posterior border of the Axilla to the crest of the Ilium.  
c. A curved transverse incision from that point following the Iliac crest posteriorly to the middle of the Sacrum.
  - ☐ 2. Remove only the skin from the entire back (above the pelvis), shoulder, and upper posterior third of the arm.
  - ☐ 3. Review the Nerves of the Occipital region, arising from the posterior divisions of C<sub>1</sub>, 2, and 3.
    - C<sub>1</sub> to muscles of the Suboccipital Triangle.
    - C<sub>2</sub> Greater Occipital (with lateral branch to adjacent muscles).
    - C<sub>3</sub> Third Occipital (with lateral branch joining that of C<sub>2</sub>).
  - ☐ 4. Identify these nerves with their connecting loops as comprising a "Posterior Cervical Plexus," not to be confused with the Cervical Plexus (proper) which is formed from the anterior divisions of C<sub>1</sub>, 2, 3, and 4.
  - ☐ 5. Identify the medial branches of the posterior rami of one or more of the five lower Cervical Nerves noting the points of their emergence into sub-cutaneous fascia.
  - ☐ 6. Locate also one or more of their lateral branches. Identify and note the muscles supplied by these branches.
- .....





- ☐ 7. Before proceeding with the dissection, review the textbook description of the composition and distribution of a Thoracic (thoraco-abdominal) Intercostal Nerve, its divisions and branches.
- ☐ 8. Identify the way in which sensation is supplied to the back by tracing at least one subcutaneous branch in each of the following groups of Thoracic Nerves:

*Central Portion (Spinal)*

- a. (Upper half) Medial Division of the Posterior Rami of Thoracics 1-6 (or 7).
- b. (Lower half) Lateral Division of the Posterior Rami of Thoracics 7-12.

*Lateral Portions (Costal)*

- c. Posterior Cutaneous branches of the Lateral Division of Anterior Rami of Thoracics 3-9. 12 extends downward upon buttock.

- ☐ 9. Locate and trace one lateral subcutaneous branch (posterior division) of the the three upper Lumbar Nerves, noting its downward course upon the buttock. They supply also the Sacrospinalis muscle, while the Medial branches terminate in the Multifidus.
- ☐ 10. Try to identify one or two small endings from the Sacral roots.
- ☐ 11. In the region of the shoulder, review the terminal filaments of the Posterior Supraclaviculars (C4); and about midpoint on the posterior border of the Deltoid, identify the exit of the Lateral Brachial Cutaneous Nerve, a branch of the Axillary Nerve, and trace its course.
- ☐ 12. Make a sketch showing the sensory areas of the back as supplied by the branches and divisions of the Spinal Nerves. Also show location of the points of exit and directions of their subcutaneous branches.

Review the Thoracic and Lumbar Vertebrae.



# DEEP BACK AND SPINAL CORD

A. TOPICS FOR DISCUSSION. Injuries and Diseases of the Vertebrae and the Cord.

## B. SPECIAL STUDY

Medulla Spinalis (Spinal Cord)

Nerves: Spinales (Muscular Branches)

## C. DIRECTIONS FOR DISSECTION AND STUDY

- ☐ 1. Dissect away the superficial fascia from the back and shoulder as far as the insertion of the Deltoid, noting that the subcutaneous vessels of the back emerge with, and accompany, the cutaneous nerves.
- ☐ 2. Review the Lumbodorsal Fascia, and its osseous attachments; also the more superficial muscles of the back.
- ☐ 3. Cut the Trapezius from its vertebral attachment and reflect laterally. Review its nerve supply and observe its blood supply from the Ascending branch of the Transverse Cervical Artery.
- ☐ 4. Locate the Descending branch of the Transverse Cervical Artery and the Dorsal Scapular Nerve. Carefully cut the Rhomboids and Levator Scapulae to follow the course of this artery and nerve as they supply these muscles.
- ☐ 5. Continue tracing this artery and nerve along the vertebral border of the Scapula, observing the branches to the Trapezius and other scapular muscles.
- ☐ 6. Cut the Latissimus dorsi along its line of origin and reflect laterally. Identify on its under surface near the lower angle of the Scapula, the Thoracodorsal Nerve and the Thoracodorsal Artery, a distal branch of the Subscapular Artery. Note the anastomosis between this branch and the Descending branch of the Transverse Cervical artery at this point.
- ☐ 7. Lift the vertebral borders of the Scapula and review the position and attachments of the Serratus Anterior from behind.
- ☐ 8. Expose and review the Serratus Posterior Superior and Inferior. What is the source of their nerve supply?  
.....
- ☐ 9. Split the Lumbodorsal Fascia about two inches from the vertebral spines and reflect to expose the Sacrospinalis.

- ☐ 10. Isolate and review its major divisions and regional subdivisions identifying their nerve supply.
  - a. Iliocostalis
  - b. Longissimus
  - c. Spinalis
- ☐ 11. Isolate and review the Semispinalis, its regional divisions and nerve supply.
- ☐ 12. Review the Multifidus, Rotators, Levatores Costarum, Interspinales and Intertransversarii; note the nerve supply of each.
- ☐ 13. In the lower thoracic region, expose and cut the laminae of three vertebrae to open into the Vertebral Canal. Identify the Ligamenta Flava, the Supraspinous and Interspinous ligaments on the removed section.
- ☐ 14. Expose the Dura Mater and open to identify the Arachnoid membrane, the Denticulate Ligament, Subarachnoid Cavity, Pia Mater and Medulla (cord), and Nerve Roots.
- ☐ 15. Dissect out a section of the Medulla with two or more of its spinal roots, ganglia, and stems of the anterior and posterior rami. Study the exit of the nerves from the canal.
- ☐ 16. Review the Osteology of the Vertebrae, Sacrum and Coccyx; include study of their blood supply and venous drainage.

Medulla Spinalis (briefly discuss).

XVI  
SHOULDER

A. TOPIC FOR DISCUSSION. Vascular Anastomoses about the Shoulder.

B. SPECIAL STUDY

*Nerves:* Plexus Brachialis and branches

*Arteries:* Axillaris and branches

*Veins:* Axillaris and branches

C. DIRECTIONS FOR DISSECTION AND STUDY

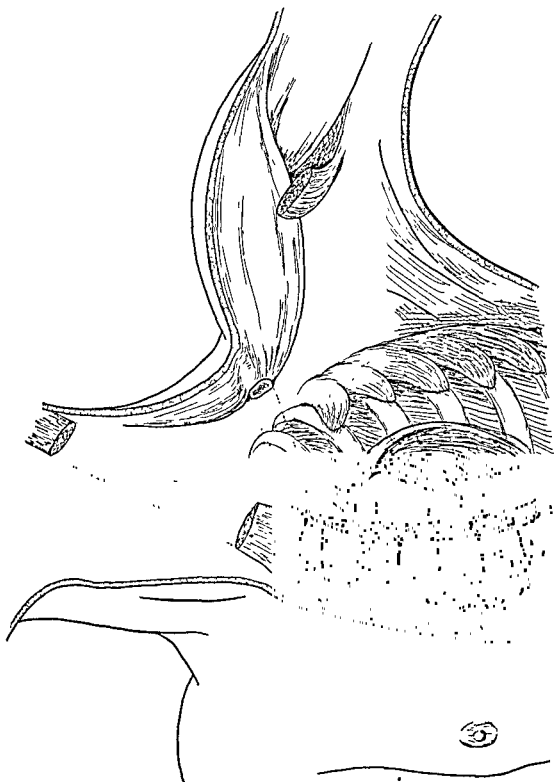
- ☐ 1. Remove the Trapezius from the spinous process of the Scapula and clear fat and connective tissue from the supraspinous region.
- ☐ 2. Carefully dissect the deep fascia from the scapular and shoulder muscles, avoiding injury to adjacent nerves and vessels.
- ☐ 3. Locate the origin of the Omohyoid muscle in the Scapula and note the relationship of the Transverse Scapular Artery and Suprascapular Nerve to the posterior belly of this muscle.
- ☐ 4. Identify the Superior Transverse Scapular Ligament bridging the Suprascapular Notch on the upper border of the Scapula. Note that the Transverse Scapular Artery passes superficially to the Ligament, while the Suprascapular Nerve passes through the Notch beneath the Ligament.
- ☐ 5. Divide the Supraspinatus at the Notch and reflect to identify its blood and nerve supply, and to follow the Transverse Scapular Artery and Suprascapular Nerve to the neck of the spinous process.
- ☐ 6. Cut the Deltoid from its spinous and acromial origins on the Scapula and reflect forward. Observe that the long head of the Triceps forms two spaces by its passage between the Teres Major and Minor muscles:
  - a. Triangular Space (located medially).  
Contains the Circumflex Scapular Artery.
  - b. Quadrangular Space Humerus forming the fourth side. Contains the Axillary Nerve and the Posterior Humeral Circumflex Artery.
- ☐ 7. In the Quadrangular Space locate the emergence of the Axillary Nerve and Posterior Humeral Circumflex Artery which supply the Deltoid. Follow their course laterally.
- ☐ 8. Identify on the Axillary Nerve the origin of the Lateral Brachial Cutaneous Nerve; also its branch to the Teres Minor muscle and Capsule of the shoulder joint.

## SHOULDER

- ☐ 19. Identify the Subscapularis muscle on the posterior wall of the Axilla and note that from an anterior approach, this muscle takes the place of the Teres Minor in forming the upper border of the Triangular and Quadrangular Spaces.
- ☐ 20. Trace the Subscapular Artery from the Axillary Artery, to its division into Scapular Circumflex Artery and Thoracodorsal Artery.
- ☐ 21. Try to identify its anastomoses with the Intercostal and Lateral Thoracic Arteries.
- ☐ 22. Expose the Posterior Cord and locate the origin of the Axillary Nerve. Also identify on the Axillary Artery, the origins of the Anterior and Posterior Circumflex Humeral Arteries.
- ☐ 23. Trace the Axillary Nerve and the Posterior Circumflex Humeral Artery deeply through the Quadrangular Space; follow the anterior branch of the nerve and artery around the surgical neck of the Humerus to identify the anastomoses of the latter with the Anterior Circumflex Humeral Artery. Note its branches to the shoulder joint, and to both Teres muscles.
- ☐ 24. Trace the Anterior Circumflex Humeral Artery, noting its branches to the shoulder joint and Deltoid. Beneath what muscles does it run?  
.....
- ☐ 25. Review the posterior branch of the Axillary Nerve; also its branches to the Teres Minor and posterior portion of the Deltoid, and its superficial continuation as the Lateral Brachial Cutaneous Nerve.
- ☐ 26. Locate the Subscapular Nerves from the Posterior Cord. Identify the innervation of the upper portion of the Subscapular muscle by the Short nerve, and of the lower part of this muscle, also the Teres Major by the Long Subscapular Nerve.

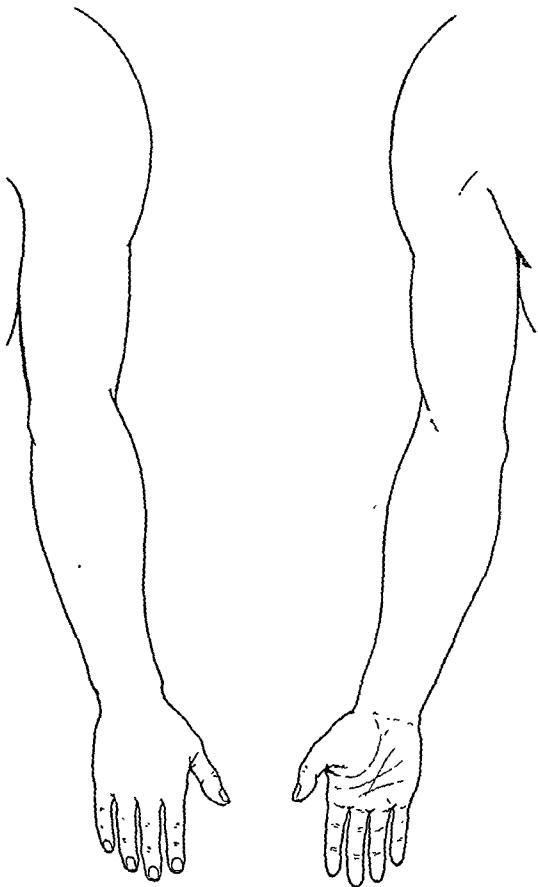
Review the Brachial Plexus in its entirety; also the muscles acting upon the Shoulder Girdle and Joint.

Review the Clavicle and Scapula.



DRAW IN THE SUBCLAVIAN ARTERY AND ITS BRANCHES; ALSO SHOW ITS  
RELATION TO THE MAJOR PARTS OF THE BRACHIAL PLEXUS





SHADE IN COLOR THE SENSORY AREAS, INDICATING THE COURSE OF THE NERVES

# UPPER EXTREMITY, SUPERFICIAL STRUCTURES

A. TOPIC FOR DISCUSSION. Sensory Areas.

B. SPECIAL STUDY

*Nerves:* Rami Cutanei from the Plexus Brachialis and its branches

*Veins:*

Cephalica and branches

Basilica and branches

C. DIRECTIONS FOR DISSECTION AND STUDY

- ☐ 1. a. Make a skin incision down the lateral side of the arm and forearm to the wrist.  
b. A circular skin incision about the wrist.  
c. A skin incision following the margins of the palm of the hand and bases of the thumb and fingers; a midline skin incision on the palmar surface of each digit.
- ☐ 2. Dissect only the skin from both ventral and dorsal surfaces, one student working on the arm and forearm, the other on the hand.

## ARM

- ☐ 3. Trace the Cephalic Vein toward the lateral side of the arm to the elbow, identifying the position of its exit from deep fascia.
- ☐ 4. In the Medial Bicipital Sulcus of the arm, locate the emergence of the Basilic Vein from deep fascia in company with the Medial Antibrachial Cutaneous Nerve from the Medial Cord of the Brachial Plexus. Trace them to the elbow, identifying the Volar and Dorsal branches of the Nerve.
- ☐ 5. Near the Axilla, review the branches of the Medial Brachial Cutaneous Nerve (also from the Medial Cord), the Intercostobrachialis (from Intercostal 2) and their anastomosis.
- ☐ 6. In the Lateral Bicipital Sulcus slightly above the elbow, the Lateral Antibrachial Cutaneous Nerve, the terminal portion of the Musculocutaneous Nerve, makes its exit from the deep fascia beside the Cephalic Vein. Retrace it deeply to see its origin.
- ☐ 7. Higher on the lateral surface of the arm, locate the Dorsal Antibrachial Cutaneous Nerve from the Radial Nerve. It pierces the deep fascia a little below the insertion of the Deltoid.

- ☐ 8. Proximally, expose the smaller **Posterior Brachial Cutaneous Nerve**, also from the **Radial Nerve**, its exit and course toward the elbow.

The deltoid area is supplied by branches of the **Lateral Brachial Cutaneous Nerve** (from the **Axillary Nerve**), and above them, the **Supraclaviculars**. These have been dissected.

#### FOREARM

- ☐ 9. At the Elbow, identify the **Medial Cubital Vein**, usually employed for venous injections.
- ☐ 10. Trace the **Cephalic** and **Basilic** veins down the forearm noting their dorsal direction on opposite sides of the wrist toward the **Rete Venosum Carpi Dorsale**, and convergence toward the base of the middle finger.
- ☐ 11. Two other major venous channels should be looked for, the **Median Antibrachial Vein** and the **Accessory Cephalic Vein**. They are quite inconstant as to size and pattern.
- ☐ 12. On the **Volar Surface** of the Forearm, locate and trace the **Lateral Antibrachial Cutaneous Nerve**, and the **Volar branch** of the **Medial Antibrachial Cutaneous Nerve**. Note the point of exit of the former.
- ☐ 13. Above the wrist, three more Cutaneous nerves pierce the deep fascia:
- Superficial branch of the **Radial Nerve**  
(on the radial side of the wrist and going dorsally from under the tendon of the **Brachioradialis**)
  - Palmar branch of the **Median Nerve**  
(from between the tendons of the **Palmaris Longus** and **Flexor Carpi Radialis**)
  - Palmar branch of the **Ulnar Nerve**  
(from under the tendon of the **Flexor Carpi Ulnaris**)

Locate and trace these nerves to their distribution on the hand, observing that the branch from the **Ulnar Nerve** supplies the **Palmaris Brevis Muscle**.

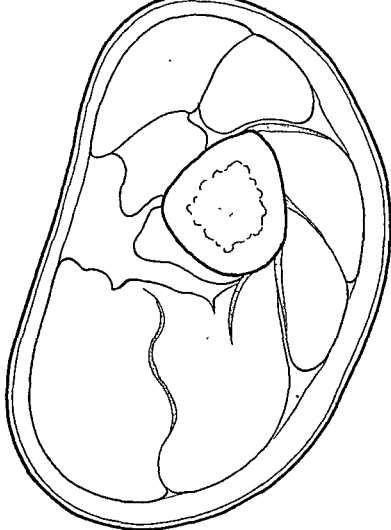
*Note:* The Cutaneous Nerves to the palmar surface of the fingers will be dissected later.

- ☐ 14. On the **Dorsal Surface** of the Forearm, two Cutaneous Nerves are to be traced from the elbow; the **Dorsal Antibrachial Cutaneous**, and the **Ulnar branch** of the **Medial Antibrachial Cutaneous Nerve**.
- ☐ 15. Locate the exit of the **Superficial branch** of the **Radial Nerve** from beneath the **Brachioradialis** tendon (two or three inches above the wrist). Trace it to the hand, exposing the lateral branch to the thumb; also the medial branch, which supplies, as far as the middle of the dorsum of the second phalanx, both sides of digits II and III and the radial side of digit IV. Sensation to the terminal phalanx is supplied by.....

- ☐ 16. Near the wrist, a Dorsal branch of the Ulnar Nerve emerges from beneath the Tendon of the Flexor Carpi Ulnaris. Trace it to the hand, to both sides of Digit V, and to the ulnar side of digit IV.
- ☐ 17. The Cutaneous Nerves communicate quite generally with adjacent nerves. Try to identify one or two of these anastomoses.
- ☐ 18. List the Cutaneous Nerves of the Upper Extremity and give their origin.

Chart in color the Sensory Areas of the Upper Extremity and the relative position of the Cutaneous Nerves to these areas. (Include the nerves to the fingers and thumb.) Page 342.

Review the Humerus.



CROSS SECTION NEAR THE JUNCTURE OF THE UPPER AND MIDDLE  
THIRDS OF THE RIGHT ARM\*

Identify and label the following muscles:

Biceps Brachii (Long head)  
Biceps Brachii (Short head)  
Coracobrachialis  
Deltoid

Triceps (Medial head)  
Triceps (Lateral head)  
Triceps (Long head)

Indicate in color the positions of the following structures:

*Arteries*

Brachial  
Deep Brachial

*Veins*

Cephalic  
Basilic  
Brachial (Comites)

Medial Intermuscular Septum  
Lateral Intermuscular Septum

*Nerves*

Intercostobrachial  
Medial Brachial Cutaneous  
Medial Antibrachial Cutaneous  
Posterior Brachial Cutaneous  
Axillary (Cutaneous)  
Median  
Musculocutaneous  
Ulnar  
Radial

\* Use color pencils to complete cross-section illustrations.

X V I I I  
A R M

A. TOPIC FOR DISCUSSION. Clinical Importance of Muscle Innervations.

B. SPECIAL STUDY

*Nerves:*

Musculocutaneous

Medianus

Ulnaris

Radialis

*Arteries:*

Axillaris

Brachialis and Branches

*Veins: Comites*

C. DIRECTIONS FOR DISSECTION AND STUDY

- ☐ 1. Remove the superficial fascia from the arm to below the elbow, preserving as well as possible the main trunks of the Cutaneous Nerves.
- ☐ 2. Split the deep fascia on the ventral surface of the arm and reflect as far as the Medial and Lateral Intermuscular Septa located anteriorly to the Triceps on each side. Do not include the Lacertus Fibrosus, and avoid injury to the underlying portions of the Cutaneous Nerves.
- ☐ 3. On the medial side, carefully expose and identify the structures which follow the Medial Bicipital Sulcus and trace them from the Axilla to the elbow.
  - a. Medial Antibrachial Cutaneous Nerve
  - b. Basilic Vein
  - c. Median Nerve
  - d. Brachial Artery
  - e. Brachial Veins (Comites)
- ☐ 4. Study the proximal portion of the Radial Nerve from the Posterior Cord where it lies dorsally to the Ulnar Nerve, to the point where it passes laterally to the long head of the Triceps muscle to enter the groove (spiral) between the medial and lateral heads. Identify the Deep Brachial Artery which accompanies it, and the point of origin of that artery.
- ☐ 5. The Brachial Artery gives off three major branches in the arm, in addition to muscular branches and a Nutrient branch to the Humerus.
  - a. Deep Brachial
  - b. Superior Ulnar Collateral
  - c. Inferior Ulnar Collateral

- ☐ 6. Locate the origin of the **Superior Ulnar Collateral Artery** at the middle level of the arm and follow its course parallel with the **Ulnar Nerve** to behind the **Medial Epicondyle**.
- ☐ 7. Just above the **Elbow** identify the **Inferior Ulnar Collateral Artery** and follow it on the anterior surface of the **Medial Epicondyle**. Note its muscular branches to the **Flexor** muscle group. •
- ☐ 8. Trace the posterior branch of the **Inferior Ulnar Collateral Artery** to the margin of the **Medial Epicondyle**. It anastomoses with the **Superior Ulnar Collateral Artery** and with other branches crossing behind the elbow to join with a posterior branch, **Radial Collateral Artery**, of the **Deep Brachial Artery**. These will be seen later.
- ☐ 9. Observe the paired **Venae Comites** following the **Brachial Artery**, and the frequent anastomoses between the former. Try to locate the **Nutrient branch** of the **Brachial Artery** to the **Humerus**.
- ☐ 10. Remove the deep fascia from the back of the arm, and retrace the **Posterior Brachial** and **Dorsal Antibrachial Cutaneous Nerves** deeply to their origin from the **Radial Nerve**.
- ☐ 11. After locating the distal and proximal portions of the **Radial Nerve** and **Deep Brachial Artery**, cut the lateral head of the **Triceps** diagonally in order to expose their course in the groove on the **Humerus**.
- ☐ 12. The **Deep Brachial Artery** gives off three branches; all supply adjacent muscles and have anastomotic connections—one at the shoulder and two below the elbow which will be seen later.
  - a. **Radial Collateral** (behind the **Lateral Epicondyle**)
  - b. **Anterior Branch**—terminal portion (in front of the **Lateral Epicondyle**)
  - c. **R. Ascendens** (between long and lateral heads of **Triceps**)
- ☐ 13. Follow the course of the **Anterior Branch** of the **Deep Brachial Artery** with the **Radial Nerve** through the **Lateral Intermuscular Septum** upon the volar surface of the **Lateral Epicondyle** between the **Brachioradialis** and **Brachialis** muscles.
- ☐ 14. Trace the **Radial Collateral Artery** behind the **Lateral Intermuscular Septum** to the posterior surface of the elbow; try to identify its anastomosis with a posterior branch of the **Inferior Ulnar Collateral Artery**.
- ☐ 15. Trace the **Ascending branch** of the **Deep Brachial Artery** upward between the lateral and long heads of the **Triceps** to its anastomosis with the **Posterior Humeral Circumflex Artery**.

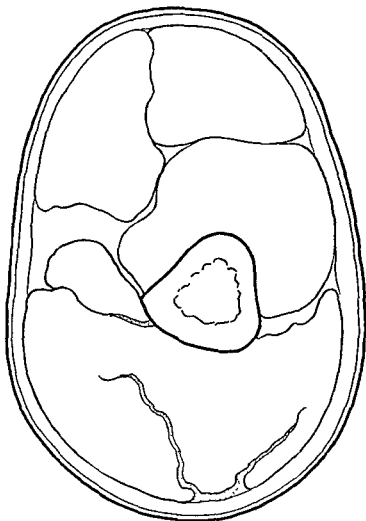
- 16. Locate the branches of the Radial Nerve to the Triceps and to the Brachioradialis. Follow its branch to the medial head of the Triceps, through that muscle to the Anconeus.

Illustrate, by a diagrammatic sketch, all the routes of collateral arterial circulation to the arm after a ligation of the third part of the Subclavian Artery.

Review the Muscles of the Shoulder Girdle and Arm, especially in regard to their action and nerve supply.

Review the Joints of the Shoulder and Shoulder Girdle.





CROSS SECTION NEAR THE JUNCTURE OF THE MIDDLE AND LOWER  
THIRDS OF THE RIGHT ARM

Identify and label the following muscles:

Biceps Brachii (Long head)

Biceps Brachii (Short head)

Brachialis

Triceps (Medial head)

Triceps (Long head)

Triceps (Lateral head)

Indicate in color the position of the following structures:

*Arteries*

Brachial

Radial Collateral

Middle Collateral of Deep Brachial

Superior Ulnar Collateral

*Veins*

Cephalic

Basilic

Brachials (Comites)

*Nerves*

Medial Antibrachial Cutaneous

Medial Brachial Cutaneous

Dorsal Antibrachial Cutaneous

Lateral Antibrachial Cutaneous

Median

Ulnar

Radial

Medial Intermuscular Septum

Lateral Intermuscular Septum

X I X  
FOREARM AND HAND

A. TOPIC FOR DISCUSSION. Anastomoses about the Elbow.

B. SPECIAL STUDY

*Nerves:*

Medianus and branches

Ulnaris and branches

Radialis and branches

*Arteries:*

Radialis and branches

Ulnaris and branches

*Veins:* Comites

Fossa cubiti

C. DIRECTIONS FOR DISSECTION AND STUDY

- ☐ 1. After reviewing the Lateral Antibrachial Cutaneous Nerve, and the Volar and Dorsal branches of the Medial Antibrachial Cutaneous Nerve, remove the superficial fascia from the forearm being careful to preserve the main trunks of the Cutaneous Nerves for the forearm and hand.

VOLAR SURFACE OF THE FOREARM

- ☐ 2. Divide the Lacertus Fibrosus at the medial border of the Biceps tendon. Split longitudinally and remove the deep fascia (antibrachial) overlying the Cubital Fossa and the volar surface of the forearm as far as its thickening at the wrist, the Volar Carpal Ligament.

CUBITAL FOSSA

- ☐ 3. Identify the boundaries of the Cubital Fossa:
- |          |                              |
|----------|------------------------------|
| Medial   | Pronator Teres               |
| Lateral  | Brachioradialis              |
| Proximal | Line between the Epicondyles |
| Floor    | Brachialis and Supinator     |
- ☐ 4. Clear fat and areolar tissue from the Fossa carefully. Expose first the Median Nerve and trace it to its entrance beneath the Pronator Teres.
- ☐ 5. Trace the Brachial Artery to its bifurcation into the Ulnar and Radial Arteries, noting the different levels taken by the two vessels in their subsequent courses.



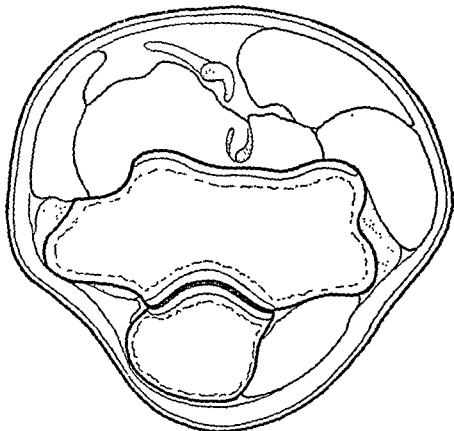
- ☐ 6. Follow the Radial Artery to the "Anatomical Snuffbox," noting its muscular branches and the origin of its Superficial Volar Artery at the wrist.
- ☐ 7. Identify the origin of the Radial Recurrent Artery from the Radial Artery and trace it upward on the Lateral Epicondyle, by separating the Brachioradialis and Brachialis, to its anastomosis with the Anterior branch of the Deep Brachial Artery.
- ☐ 8. Isolate the Pronator Teres, Flexor Carpi Radialis and Palmaris longus and, pulling them aside, observe the passage of the Median Nerve between the superficial and deep heads of the Pronator Teres. Identify the nerve branches to these muscles.
- ☐ 9. Carefully isolate and lift the Brachioradialis to expose the course of the Radial Nerve between that muscle and the Brachialis in front of the Lateral Epicondyle. Locate its bifurcation into superficial and deep branches.
- ☐ 10. Trace the Superficial Branch of the Radial Nerve beneath the Brachioradialis and its tendon, to the exit of the nerve (cutaneous) on the lateral side of the forearm two or three inches above the wrist. It has no muscular branches, being purely sensory. Observe its parallel course with the Radial Artery in the middle third of the forearm.
- ☐ 11. Cut the Pronator Teres near its insertion; also divide the tendons of the Palmaris Longus and Flexor Carpi Radialis at different levels. Reflect these muscles to expose the Flexor Sublimis Digitorum.
- ☐ 12. Note the relations of the following to the two heads of the Pronator Teres:
  - Median Nerve . . . . .
  - Radial Artery . . . . .
  - Ulnar Artery . . . . .
- ☐ 13. Isolate the Flexor Digitorum Sublimis, and cut its origin on the Radius. Reflecting the muscle, observe the course of the Median Nerve crossing the Ulnar Artery and running to the wrist beside the tendon of the Flexor Pollicis Longus.
- ☐ 14. Proximal to the crossing, identify two branches of the Ulnar Artery:
  - a. Anterior Ulnar Recurrent
  - b. Posterior Ulnar Recurrent
 They may originate from a single short trunk.
- ☐ 15. Identify on the volar surface of the Median Nerve, (a) the slender Median Artery accompanying the nerve toward the wrist, and (b) the Palmar Cutaneous Branch of the Nerve, which originates and pierces the deep fascia about two inches above the wrist.

- ☐ 16. About at the point where the Median Nerve crosses the Ulnar Artery, identify the following:
- Volar Interosseous Nerve** (from the Median N.) which innervates the deeper muscles on the volar side of the forearm.
- Common Interosseous Artery** (from the Ulnar A.) a short trunk which divides almost immediately into two branches, the **Volar and Dorsal Interosseous Arteries**.
- ☐ 17. Locate the origin of the Median Artery from the Volar Interosseous Artery.
- ☐ 18. With blunt dissection, separate the **Flexor Digitorum Profundus** and **Flexor Pollicis Longus** to follow the **Volar Interosseous Nerve and Artery** upon the **Interosseous Membrane** to the **Pronator Quadratus** where a **Perforating Branch** passes dorsally through the Membrane and runs distally. It has an anastomosis with the **Dorsal Interosseous Artery**.
- ☐ 19. Identify the origin of the **Dorsal Interosseous Artery** and note its passage above the proximal border of the **Interosseous Membrane** to the dorsal side.
- ☐ 20. Carefully isolate the **Flexor Carpi Ulnaris**, noting the course of the **Ulnar Nerve** and **Superior Ulnar Collateral Artery** between the humeral and olecranon heads of that muscle.
- ☐ 21. Cut the humeral head of the **Flexor Carpi Ulnaris** and reflect it to expose the **Ulnar Nerve**. Trace the Nerve to the volar side of the forearm in its upper third, where its course becomes adjacent to that of the **Ulnar Artery**. Identify the muscular branches of both of these structures.
- ☐ 22. Above the wrist, locate the origins of the **Volar and Dorsal Cutaneous Branches** of the **Ulnar Nerve**, which continue superficially upon the wrist and hand.
- ☐ 23. Trace the **Anterior Ulnar Recurrent Artery** to its anastomosis with the **Inferior Ulnar Collateral Artery** on the anterior surface of the **Medial Epicondyle**; also the **Posterior Ulnar Recurrent Artery** upward behind the **Medial Epicondyle** to its anastomosis with the **Superior Ulnar Collateral Artery**, following the course of the **Ulnar Nerve**.

Sketch the Arterial Anastomoses about the Elbow; also the boundaries and contents of the Cubital Fossa.

Review the muscles of the Arm and flexor group of the forearm, including their innervation; also the bones and joints of the forearm and wrist.





CROSS SECTION OF ARM NEAR THE RIGHT ELBOW JOINT

Identify and label the following muscles and tendons:

Biceps tendon

Brachialis

Brachioradialis

Extensor Carpi Radialis Longus

Anconeus

Origin of Forearm Extensors (tendon)

Origin of Forearm Flexors (tendon)

Indicate in color the position of the following structures:

*Arteries*

Brachialis

Recurrent Radial

Interosseous Recurrent

Anterior Recurrent Ulnar

Posterior Recurrent Ulnar

*Nerves*

Lateral Antibrachial Cutaneous

Medial Antibrachial Cutaneous

Dorsal Antibrachial Cutaneous

Radial

Median

Ulnar

*Veins*

Cephalic

Brachial

Basilic

## DORSUM OF FOREARM AND HAND

A. TOPIC FOR DISCUSSION. Lymphatics of the Arm and Hand.

B. SPECIAL STUDY

*Nerves:*

Radialis profundus

Interosseus dorsalis

*Arteries:*

Interossea antibrachii dorsalis

Interossea antibrachii volaris (dorsal branch)

Radialis

Arcus carpi dorsalis

*Veins:*

Comites

Rete venosum dorsale manus

C. DIRECTIONS FOR DISSECTION AND STUDY

- ☐ 1. Review the Cutaneous Nerves on the dorsum of the forearm; then remove the deep (Antibrachial) fascia as far as the Dorsal Carpal Ligament, leaving the deeper Intermuscular Septa.
- ☐ 2. Carefully raise the Extensor Digitorum Communis and Extensor Digiti Quinti. Cut them just above their tendons. As these muscles are reflected upward, identify their branches of innervation from the Deep Radial Nerve which will be seen emerging from the Supinator muscle.
- ☐ 3. Cut the Extensor Carpi Ulnaris near its origin on the Lateral Epicondyle, and reflect downward to expose between it and the Extensors Pollicis Longus and Indicis, the course of the Dorsal Interosseous Artery lying with the branches of the Deep Radial Nerve.
- ☐ 4. By dividing the Extensor Pollicis Longus and Extensor Indicis near their tendons (do this at different levels) the terminal portion of the Deep Radial Nerve, Dorsal Interosseous Nerve, can be exposed, lying against the Abductor and Extensor brevis of the Thumb. It extends only to the wrist, and ends in a fusiform enlargement.
- ☐ 5. In the same field the Perforating Branch of the Volar Interosseous Artery will be seen upon the dorsal surface of the Interosseous Membrane. Try to identify its anastomosis with the Dorsal Interosseous Artery.



- ☐ 6. Near the elbow, identify the origin of the **Recurrent Interosseous Artery** from the **Dorsal Interosseous Artery**; by carefully cutting the **Anconeus** muscle, trace it to its anastomosis with the **Radial Collateral Artery** (from the **Deep Brachial Artery**) on the posterior side of the **Lateral Epicondyle**.
- ☐ 7. Flex the elbow to relax the **Brachioradialis** and **Extensor Carpi Radialis Longus**; then starting at its dorsal border, cut the **Supinator** and the overlying **Extensor Carpi Radialis Brevis** muscles, to follow the continuity of the **Deep Radial Nerve**.
- ☐ 8. After reviewing the exposed **Cutaneous Nerves** of the hand, remove the deep fascia of the dorsum from the distal border of the **Dorsal Carpal Ligament** to the base of the fingers.
- ☐ 9. Identify the tendons forming the **Anatomical Snuffbox**. Then expose the short dorsal course of the **Radial Artery** emerging at this point and running under the tendon of the **Extensor Pollicis Longus**, to dip anteriorly in the first **Intermetatarsal Space**. Observe its branches to each side of the thumb and the radial side of the index finger.
- ☐ 10. Split each separate compartment in the **Dorsal Carpal Ligament** and identify the respective tendons contained in them.
  - a. **Abductor Pollicis Longus**, **Extensor Pollicis Brevis**
  - b. **Extensors Carpi Radialis Longus** and **Brevis**
  - c. **Extensor Pollicis Longus**
  - d. **Extensors Indicis** and **Digitorum Communis**
  - e. **Extensor Digiti Quinti**
  - f. **Extensor Carpi Ulnaris**
- ☐ 11. Observe variations in the uniting bands between the **Digital Extensors**.
- ☐ 12. Locate in the **Anatomical Snuffbox**, the origin of the **Dorsal Carpal branch** of the **Radial Artery**. Follow it transversely beneath the tendons as the **Arcus Carpi Dorsalis**, to its anastomotic union with the **Interosseous branches** of the **Ulnar Artery**.
- ☐ 13. Follow the **Dorsal Intermetacarpal Arteries** originating from the **Dorsal Carpal Arch** in their respective spaces to the base of the fingers where they divide as **Rami Digitales**, to supply the adjacent sides of the fingers. Locate also the **Perforating Rami** sent anteriorly to corresponding **Volar Arteries**.
- ☐ 14. The medial side of the fifth digit is supplied by a dorsal branch of the **Ulnar Artery**.

Review all the muscles of the Forearm and their innervation; also the bones and joints of the Wrist and Hand.



CROSS SECTION ABOUT JUNCTURE OF UPPER AND MIDDLE THIRDS OF RIGHT FOREARM

Identify and label the following—

Palmaris Longus  
Flexor Carpi Ulnaris  
Flexor Carpi Radialis  
Flexor Digitorum Sublimis  
Pronator  
Flexor Digitorum Profundus  
Flexor Pollicis Longus  
Brachioradialis

Extensor Carpi Radialis Longus  
Extensor Carpi Radialis Brevis  
Supinator  
Extensor Pollicis Longus  
Extensor Carpi Ulnaris  
Extensor Digiti Quinti  
Extensor Digitorum Communis

Locate and label the following—

*Arteries*

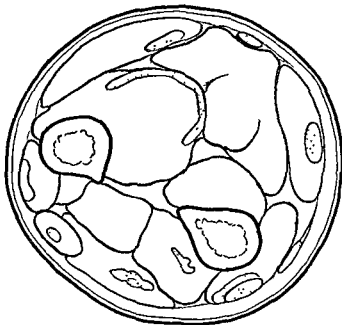
Radial  
Ulnar  
Volar Interosseous  
Dorsal Interosseous

*Veins*

Basilic  
Cephalic

*Nerves*

Lateral Antibrachial Cutaneous  
Medial Antibrachial Cutaneous  
Volar Ramus  
Ulnar Ramus  
Dorsal Antibrachial Cutaneous  
Superficial Ramus Radial  
Deep Ramus Radial  
Median  
Ulnar  
Volar Interosseous  
Dorsal Interosseous



CROSS SECTION ABOUT JUNCTURE OF MIDDLE AND LOWER THIRDS OF RIGHT FOREARM

Identify the following—

Palmaris Longus tendon  
 Flexor Carpi Ulnaris  
 Flexor Carpi Radialis  
 Flexor Digitorum Sublimis  
 Flexor Digitorum Profundus  
 Flexor Pollicis Longus  
 Brachioradialis tendon  
 Extensor Carpi Radialis Longus tendon

Extensor Carpi Radialis Brevis  
 Abductor Pollicis Longus  
 Extensor Pollicis Longus  
 Extensor Indicis Proprius  
 Extensor Carpi Ulnaris  
 Extensor Digiti Quinti  
 Extensor Digitorum Communis

. Locate and label the following—

*Arteries*

Radialis  
 Ulnaris  
 Volar Interosseous  
 Dorsal Interosseous

*Veins*

Basilic  
 Cephalic

*Nerves*

Lateral Antibrachial Cutaneous  
 Medial Antibrachial Cutaneous  
     Volar Ramus  
     Ulnar Ramus  
 Dorsal Antibrachial Cutaneous  
 Superficial Ramus Radial  
 Median  
 Ulnar  
 Volar Interosseous

X X I  
HAND (COMPLETED)

A. TOPICS FOR DISCUSSION. Palmar Spaces and Tendon Sheaths.

B. SPECIAL STUDY

*Nerves:* (Terminal branches)

Medianus

Ulnaris

*Arteries:*

Ulnaris—Arcus volaris superficialis

Digitales volares communes

Digitales volares propriae

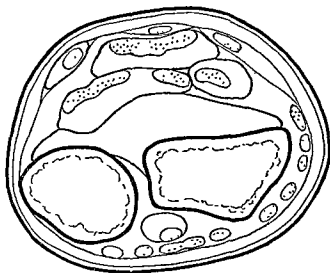
Radialis—Arcus volaris profundus

Metacarpeae volares

*Veins:* Comites

C. DIRECTIONS FOR DISSECTION AND STUDY

- ☐ 1. Starting from the radial border of the hand, dissect up the deep fascia which covers the muscles of the Thenar Eminence to its medial fusion with the Palmar Aponeurosis.
- ☐ 2. On the ulnar side, after identifying the superficial branches of the Ulnar Nerve and Artery going to the little finger, dissect up the deep fascia and Palmaris Brevis covering the Hypothenar muscles.
- ☐ 3. Starting at the wrist, reflect the Palmar Fascia distally, exposing the underlying Ulnar Nerve and Artery, also the Superficial Volar Arch, a continuation of the latter.
- ☐ 4. Identify five (5) branches given off by the Ulnar Nerve after it passes the Pisiform bone:
  - a. Deep Volar (to be traced later)
  - b. to the Medial side of digit V
  - c, d. to adjacent sides of digits IV and V
  - e. Anastomotic, to the branch of the Median Nerve for the radial side of digit IV



CROSS SECTION NEAR RIGHT WRIST

Identify the following muscles or tendons:

Palmaris Longus  
 Flexor Carpi Radialis  
 Flexor Carpi Ulnaris  
 Flexor Digitorum Sublimis  
 Flexor Pollicis Longus  
 Flexor Digitorum Profundus  
 Brachioradialis  
 Pronator Quadratus

Abductor Pollicis Longus  
 Extensor Pollicis Brevis  
 Extensor Carpi Radialis Longus  
 Extensor Carpi Radialis Brevis  
 Extensor Pollicis Longus  
 Extensor Digitorum Communis  
 Extensor Indicis Proprius  
 Extensor Digiti Quinti Proprius  
 Extensor Carpi Ulnaris

Locate and label the following—

*Arteries*

Radial  
 Ulnar

*Veins*

Basilic  
 Cephalic

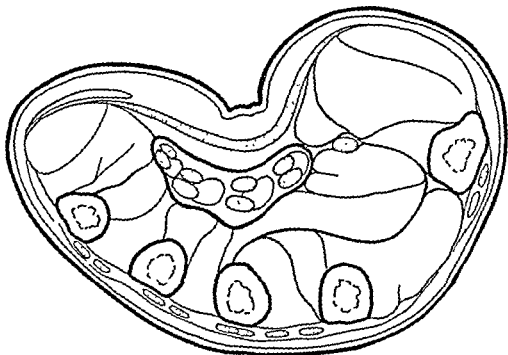
*Nerves*

Superficial Ramus of Radial  
 Superficial Ramus of Ulnar  
 Lateral Antibrachial Cutaneous  
 Dorsal Ramus of Ulnar  
 Median  
 Ulnar  
 Deep Ramus of Radial

- ☐ 5. Identify the five (5) branches given off by the Ulnar Artery and Superficial Volar Arch:
- Deep Volar, to Deep Volar Arch (to be traced later). It accompanies the Deep Volar Branch of the Ulnar Nerve.
  - to the medial side of digit V.
  - d, e. Common Volar Digital Arteries, located in Metacarpal Interspaces II, III, and IV, each dividing for the adjacent sides of the corresponding fingers as Proper Digital Arteries. (The adjacent sides of the index finger and thumb are supplied through the Deep Volar Arch.)
- ☐ 6. Identify and trace the anastomotic completion of the Superficial Volar Arch with the Radial Artery:
- by a Superficial Volar branch of the Radial Artery, or
  - by the Princeps Pollicis Artery (of the Deep Volar Arch)
- ☐ 7. Distal to the Transverse Carpal Ligament, expose the Median Nerve and trace its branches to the Thenar muscles and to both sides of digits I, II, and III, and the radial side of IV. In doing this, also try to identify the small twigs to Lumbricales I and II.
- ☐ 8. The Thenar muscles innervated by the Median Nerve are:
- .....
- .....
- ☐ 9. Review the bony attachment of the Transverse Carpal Ligament; then divide it and review the underlying tendons and their sheaths. Identify the proximal prolongations of the sheaths for the long flexor tendons to digits I and V, as the Radial and Ulnar Bursa respectively. These bursae may communicate near the wrist.

## PALMAR SPACES

- ☐ 10. Of particular clinical importance, are the fascial planes and spaces on the palmar side of the hand. Before proceeding with dissection, the students should review the tendon sheaths of the hand.
- ☐ 11. Carefully reflect the tendons of the Digital Flexors, Sublimis and Profundus, noting in the midpalmar region the delicate membrane which underlies the tendons and serves as the roof for the two fascial spaces of the palm:
- Midpalmar superficial to Metacarpal IV
  - Thenar superficial to the Adductor pollicis and metacarpal II
- Also identify the thin septum which separates these spaces by attaching to Metacarpal III. It may be an incomplete separation.



CROSS SECTION OF THE RIGHT HAND THROUGH THE PROXIMAL  
PORTION OF THE METACARPAL BONES

Identify and label the following muscles and tendons:

- |                                   |                                     |
|-----------------------------------|-------------------------------------|
| Palmaris Brevis                   | Flexor Digitorum Profundus tendons  |
| Abductor Digiti Quinti            | Lumbricales                         |
| Flexor Digiti Quinti Brevis       | Adductor Pollicis (2 heads)         |
| Opponens Digiti Quinti Brevis     | Volar Interossei (3)                |
| Abductor Pollicis Brevis          | Dorsal Interossei (4)               |
| Flexor Pollicis Brevis            | Extensor Digitorum Communis tendons |
| Opponens Pollicis                 | Extensor Indicis Proprius tendon    |
| Flexor Pollicis Longus tendon     | Extensor Pollicis Brevis tendon     |
| Flexor Digitorum Sublimis tendons | Extensor Digiti Quinti Proprius     |

Indicate in color the position of the following structures:

*Arteries*

- Ulnar
- Superficial Volar (Radial)
- Deep Volar Arch
- (Radial and Ulnar segments)

*Veins (Superficial)*

- Dorsal
- Palmar

*Nerves*

- Median
- Superficial Branch of Ulnar
- Deep Branch of Ulnar
- Dorsal Branches of Radial
- Dorsal Branch of Ulnar

- 12. Try to identify the innervation of the two medial Lumbricals (III and IV) from the Deep Volar branch of the Ulnar Nerve which lies deeply; then dissect the sheath of one of the Lumbricals to identify it as a route for infection to travel from the superficial web of the fingers into one of the deep midpalmar spaces.  
Lumbrical I, into the Thenar Space  
Lumbricals II, III, IV, into the Midpalmar Space
- 13. Expose and divide at their center, the Oblique and Transverse portions of the Adductor Pollicis.
- 14. Follow the Deep Volar branch of the Ulnar Artery and Nerve beneath the Flexor Brevis Digiti Quinti (cutting the muscle); trace the Artery across the palm as the Deep Volar Arch, to the first Metacarpal Interspace where it dips dorsally to continue as the short dorsal portion of the Radial Artery.
- 15. In the First Interspace, identify the Princeps Pollicis Artery and trace its branches to the two sides of the thumb and lateral side of the index finger.
- 16. In Interspaces II, III, and IV, identify its Volar Metacarpal branches which supply the Interossei muscles and terminate in the more superficial Common Volar Digital Arteries.
- 17. Observe the deeper portion of the Deep Volar Branch of the Ulnar Nerve to the Deep Volar Arch. Identify its branches to:
- Hypothenar Muscles
  - Interossei, Palmar and Dorsal
  - Lumbricales III and IV
  - Adductor Pollicis and deep head of the Flexor Pollicis Brevis

*Note:* All the small muscles of the hand are supplied by the Ulnar Nerve with the exception of the three most superficial Thenar Muscles, and Lumbricales I and II (by Median Nerve).

Review all the muscles of the Forearm and Hand, especially in regard to their action and nerve supply.

Review the Palmar Spaces and Tendon Sheaths, especially of the thumb and little finger, for their surgical significance.

On an outline tracing of your own Hand (page 366), show:

- the relative positions of Superficial and Deep Volar Arches.
- the extent of the Palmar Spaces and Tendon Sheaths.

Review the Lymph drainage of the Upper Extremity, and briefly describe.



1

2

3

4

## CIRCULATION OF THE BRAIN

### A. TOPICS FOR DISCUSSION. Vascular Topography.

#### B. SPECIAL STUDY

Meninges and Spaces

*Nerves:* Cerebrales

*Arteries:*

Carotis interna	Cerebri
Vertebralis	Meningeae
Circulus arteriosus (Willis)	

*Veins:*

Cerebri	Cerebelli
Cerebri magna (Galen)	

### C. DIRECTIONS FOR DISSECTION AND STUDY

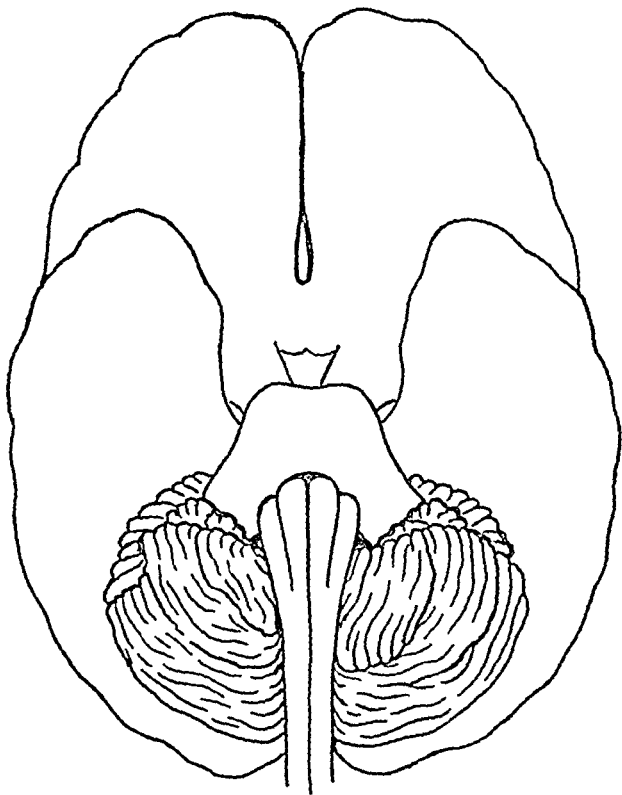
- ☐ 1. a. Tie a string around the cranium one inch above the orbital margins and one inch above the External Occipital Protuberance. Draw a line around the skull along the position of the string.
- b. In order to avoid injury to the meninges and brain, saw through only the external plate at first, then through the inner plate. Pry off the skull cap maintaining the Dura Mater in position.
- ☐ 2. Identify the anterior and posterior distribution of the Middle Meningeal Artery and associated veins, noting the point of their convergence.
- ☐ 3. Compare the interior of the Calvarium with the conformation of the brain and course of its blood vessels. Look for variations in its sutures and other anomalies.
- ☐ 4. Slit the Superior Sagittal Sinus and note the Lateral Lacunae and the distribution of Arachnoidal Granulations (Pachionian Bodies).
- ☐ 5. Carefully cut the Dura Mater closely parallel (one-half inch) to each side of the Sinus and laterally from the vertex toward each ear. Reflect the meningeal flaps over the cut edge of the skull exposing the Arachnoid Membrane.
- ☐ 6. Identify the Superior Cerebral Veins and their openings into the Superior Sagittal Sinus.

*Removal of the Brain*

- ☐ 7. Place a block under the neck to allow the head to drop well backward.
- Cut the Falx Cerebri at its insertion on the Crista Galli and reflect backward. Observe that the Inferior Sagittal Sinus runs along the lower crescentic border of the Falx Cerebri.
  - Supporting the brain with one hand, lift the Frontal Lobes with the other to expose the Olfactory Bulbs. Separate the Bulbs from the Cribriform plate of the Ethmoid bone with fingers or knife handle, tearing the small Olfactory Nerves.
  - Identify the Optic Nerves and cut the right one near the Chiasma and the left one near its exit to the orbit.

*Note:* This method should be followed in dividing all the other Cranial nerves, in each case leaving the stems on the right side as long as possible on the floor of the cranium; and on the left side, as long as possible upon the Brain.

- Identify the Internal Carotid Arteries, Infundibulum, the Oculomotor (III), and Trochlear (IV) Nerves. Cut them in turn.
  - Expose the Tentorium clearly and carefully incise it close to its attached border with the knife tip in order to avoid cutting into the underlying Cerebellum.
  - Passing the fingers of the left hand into the Occiput, and after gentle traction upon the brain with the right hand to stretch the remaining nerves, divide them as directed above.
  - Finally, retracting the Brain with care, pass a brain knife in close contact with the basilar portion of the Occipital bone to avoid cutting the blood vessels at the base of the brain, and divide the Cord as low as possible.
- ☐ 8. Compare the position of the cut ends of the Internal Carotid Artery on the Brain and on the base of the skull. Also identify the position of the Vertebral and Basilar Arteries on both structures.
- ☐ 9. Study and sketch the exact topography of the Circulus Arteriosus to the brain and to the cranial floor. (Pages 369 and 372.)
- ☐ 10. Identify the following intracranial branches of the Vertebral Artery and note their destination:
- Anterior Spinal . . . . .
- Posterior Inferior Cerebellar . . . . .
- Posterior Meningeal . . . . .
- Other branches are the Medullary and Posterior Spinal Arteries; also observe the terminal union of the Vertebral Arteries to form the Basilar Artery.



SKETCH THE ARTERIES IN RELATION TO THE BASE OF THE BRAIN;  
ALSO INDICATE THE ROOTS OF THE CEREBRAL NERVES

- ☐ 11. Identify the following branches of the Basilar Artery noting their destination:
- Anterior Inferior Cerebellar .....
- Internal Auditory .....
- Superior Cerebellar .....
- Pontine .....
- Posterior Cerebral .....
- ☐ 12. Identify the Posterior Communicating Artery joining the Posterior Cerebral and Internal Carotid Arteries.
- ☐ 13. Examine the position of the two openings of the Carotid Canal in a cleaned skull and study the course of this bony channel. On the cadaver, note the relations of the Internal Carotid Artery inside and outside the skull. Being careful not to injure the cranial nerves passing to the orbit, open the wall of the Cavernous Sinus to observe the course of the artery within that structure.
- ☐ 14. The Middle Cerebral Artery originates as the prolongation of the Internal Carotid Artery after its passage through the Cavernous Sinus. Identify the cerebral branches of the latter artery:
- a. Middle Cerebral
- b. Anterior Cerebral
- c. Posterior Communicating
- d. Choroidal
- ☐ 15. Trace the course of the Temporal branches of the Middle Cerebral Artery.
- ☐ 16. Follow the course of the Anterior Cerebral Arteries in relation to the Longitudinal Fissure.
- ☐ 17. Try to identify the various small Ganglionic Arteries given off from the Circle of Willis.
- ☐ 18. Identify the external veins of the Brain and note their points of drainage:
- Superior Cerebral .....
- Middle Cerebral .....
- Inferior Cerebral .....

- ☐ 19. Read up and write a brief description of the internal veins of the Brain including the Basal and Great Cerebral (Galen), noting their points of drainage.

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- ☐ 20. Identify the cut end of the Sinus Rectus which drains the Great Cerebral Vein.

Identify the Cerebellar Veins noting their points of drainage:

Superior Cerebellar .....

Inferior Cerebellar .....

- ☐ 21. Meningeal Arteries. Identify the course and areas of distribution of the following:

a. Middle Meningeal Artery. Expose the union of the Anterior and Posterior branches.

b. Anterior Meningeal Artery. Origin? .....

c. Meningeal Branch of the Occipital Artery. Note the foramen of entrance into the skull.

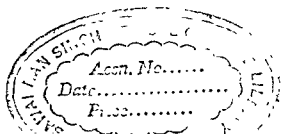
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d. Meningeal Branch of the Vertebral Artery. It enters the skull through

.....

Complete the sketch on page 369 to show all arteries of the Brain located on its under surface.

Review the structures passing through the foramina on the base of the Skull.  
(Page 308.)



- ☐ 10. Cut away the roof of the Cavernous Sinus to expose its extent as far forward as the Superior Orbital Fissure. Identify its contents, the Internal Carotid Artery and Abducens Nerve; and associated structures on the lateral wall, the Oculomotor, Trochlear, and the Ophthalmic and Maxillary divisions of the Trigeminal Nerve.
- ☐ 11. From its anterior end trace the small Sphenoparietal Sinuses laterally along the lower surface of the smaller wings of the Sphenoid bone.
- ☐ 12. Locate the Anterior and Posterior Intercavernous Sinuses, uniting the Cavernous Sinuses and forming the Circular Sinus, which surrounds the stem of the Hypophysis.
- ☐ 13. Try to identify the Basilar Plexus lying on the basilar portion of the Occipital bone between the Inferior Petrosal Sinuses which it connects.
- ☐ 14. Identify the following larger Emissary Veins:
  - Parietal through Parietal Foramen
  - Between Scalp Veins and Superior Sagittal Sinus
  - Mastoid through Mastoid Foramen
  - Between Posterior Auricular } and Transverse Sinus
  - or Occipital Vein }
  - Occipital through Condylloid Foramen
  - Between Deep Cervical Veins and Transverse Sinus
- ☐ 15. Identify or study the veins which drain into the Sinuses as follows:
  - a. Into the Superior Sagittal Sinus (See Par. 16)
    - Superior Cerebral
    - Parietal Emissary
    - Diploic
  - b. Into the Straight Sinus
    - Superior Cerebellar
    - Great Cerebral (Galen)
    - Basal
    - Internal Cerebral
    - Terminal
    - Choroidal
  - c. Into the Cavernous Sinus (See Par. 16)
    - Middle Cerebral
    - Superior Ophthalmic
    - Inferior Ophthalmic
    - Emissary veins from the Pterygoid Plexus
  - d. Into the Superior Petrosal Sinus
    - Inferior Cerebral
    - Superior Cerebellar
    - Inferior Cerebellar

- e. Into the Inferior Petrosal Sinus
  - Internal Auditory
  - Inferior Cerebellar
- f. Into the Transverse Sinus (See Par. 16)
  - Inferior Cerebral
  - Superior Cerebellar
  - Inferior Cerebellar
  - Mastoid and Occipital
- g. Into the Occipital Sinus
  - Inferior Cerebellar

□ 16. Other Emissary Veins are:

Between the Cavernous Sinus and the Pterygoid Plexus

- a. Rete Foraminis Ovalis through Foramen Ovale
- b. Emissary Veins through Foramen Lacerum
- c. Emissary Vein through Foramen of Vesalius

Between the Cavernous Sinus and the Internal Jugular Vein

- d. Internal Carotid Plexus, through the Carotid Canal

Between the Transverse Sinus and Deep Cervical Veins

- e. Rete Canalis Hypoglossi, through the Hypoglossal Canal

Between the Superior Sagittal Sinus and Veins of Nasal Cavity

- f. Emissary Veins, through the Foramen Cecum

□ 17. Briefly describe the following Diploic Veins:

Frontal . . . . .

. . . . .

Anterior Temporal . . . . .

. . . . .

Posterior Temporal . . . . .

. . . . .

Occipital . . . . .

. . . . .

Describe the structure of a Dural Sinus.

Make a drawing of the Dural Sinuses on page 372 and indicate with arrows the direction of their venous flow.

Draw a vertical cross section of the Cavernous Sinus showing the position of its contents, and associated structures.

Review the Ethmoid bone.





## VENOUS CIRCULATION OF THE CRANIUM

A. TOPICS FOR DISCUSSION. Externo-internal Venous Anastomoses. Clinical Importance.

B. SPECIAL STUDY

Sinus durae matris

Emissaria

Venae diploicae

C. DIRECTIONS FOR DISSECTION AND STUDY

- ☐ 1. Review the shape, size and position of the compartments of the Cranial Cavity formed by the Dura, Falx and Tentorium.
- ☐ 2. Trace the Superior Sagittal Sinus in relation to the Right and Left Transverse Sinus.
- ☐ 3. Trace the Inferior Sagittal Sinus to its union with the Straight Sinus; then follow the latter by splitting to observe its relation to the Transverse Sinuses.
- ☐ 4. Identify the presence of a dilatation, the Confluens Sinuum, at the inferior end of the Superior Sagittal Sinus, and the opening into it of the Occipital Sinus.

Note if there is a connecting channel between the Confluens Sinuum and the union of the Straight and Transverse Sinus of the opposite side.

- ☐ 5. Complete a division of the Tentorium from its bony attachment by cutting along the course of the Transverse Sinuses and of the Superior Petrosal Sinuses to the Cavernous Sinus.
- ☐ 6. Cut the Falx from the Occipital bone to follow the course of the Occipital Sinus posteriorly to the Foramen Magnum. Verify its point of drainage.
- ☐ 7. Continue opening of the Temporal portion, Sigmoid Sinus of the Transverse Sinus, tracing it medially to the Jugular Foramen to drain into the Internal Jugular Vein.
- ☐ 8. Study carefully the relation of the Sigmoid Sinus to the Mastoid portion of the Temporal Bone. Its proximity is an element of great danger in Mastoid operations.
- ☐ 9. Locate the Inferior Petrosal Sinus and follow it along the margin of the basilar portion of the Occipital bone to the Cavernous Sinus.

- ☐ 10. Cut away the roof of the **Cavernous Sinus** to expose its extent as far forward as the **Superior Orbital Fissure**. Identify its contents, the **Internal Carotid Artery** and **Abducens Nerve**; and associated structures on the lateral wall, the **Oculomotor**, **Trochlear**, and the **Ophthalmic** and **Maxillary** divisions of the **Trigeminal Nerve**.
- ☐ 11. From its anterior end trace the small **Sphenoparietal Sinuses** laterally along the lower surface of the smaller wings of the **Sphenoid bone**.
- ☐ 12. Locate the **Anterior** and **Posterior Intercavernous Sinuses**, uniting the **Cavernous Sinuses** and forming the **Circular Sinus**, which surrounds the stem of the **Hypophysis**.
- ☐ 13. Try to identify the **Basilar Plexus** lying on the basilar portion of the **Occipital bone** between the **Inferior Petrosal Sinuses** which it connects.
- ☐ 14. Identify the following larger **Emissary Veins**:
  - Parietal through Parietal Foramen**  
Between Scalp Veins and **Superior Sagittal Sinus**
  - Mastoid through Mastoid Foramen**  
Between Posterior Auricular } and **Transverse Sinus**  
or Occipital Vein }
  - Occipital through Condylloid Foramen**  
Between Deep Cervical Veins and **Transverse Sinus**
- ☐ 15. Identify or study the veins which drain into the **Sinuses** as follows:
  - a. Into the **Superior Sagittal Sinus** (See Par. 16)
    - Superior Cerebral**
    - Parietal Emissary**
    - Diploic**
  - b. Into the **Straight Sinus**
    - Superior Cerebellar**
    - Great Cerebral (Galen)**
    - Basal**
    - Internal Cerebral**
    - Terminal**
    - Choroidal**
  - c. Into the **Cavernous Sinus** (See Par. 16)
    - Middle Cerebral**
    - Superior Ophthalmic**
    - Inferior Ophthalmic**
    - Emissary veins from the Pterygoid Plexus**
  - d. Into the **Superior Petrosal Sinus**
    - Inferior Cerebral**
    - Superior Cerebellar**
    - Inferior Cerebellar**

e. Into the **Inferior Petrosal Sinus**

Internal Auditory

Inferior Cerebellar

f. Into the **Transverse Sinus** (See Par. 16)

Inferior Cerebral

Superior Cerebellar

Inferior Cerebellar

Mastoid and Occipital

g. Into the **Occipital Sinus**

Inferior Cerebellar

☐ 16. Other Emissary Veins are:Between the **Cavernous Sinus** and the **Pterygoid Plexus**

a. Rete Foraminis Ovalis through Foramen Ovale

b. Emissary Veins through Foramen Lacerum

c. Emissary Vein through Foramen of Vesalius

Between the **Cavernous Sinus** and the **Internal Jugular Vein**

d. Internal Carotid Plexus, through the Carotid Canal

Between the **Transverse Sinus** and **Deep Cervical Veins**

e. Rete Canalis Hypoglossi, through the Hypoglossal Canal

Between the **Superior Sagittal Sinus** and **Veins of Nasal Cavity**

f. Emissary Veins, through the Foramen Cecum

☐ 17. Briefly describe the following **Diploic Veins**:

Frontal . . . . .

. . . . .

Anterior Temporal . . . . .

. . . . .

Posterior Temporal . . . . .

. . . . .

Occipital . . . . .

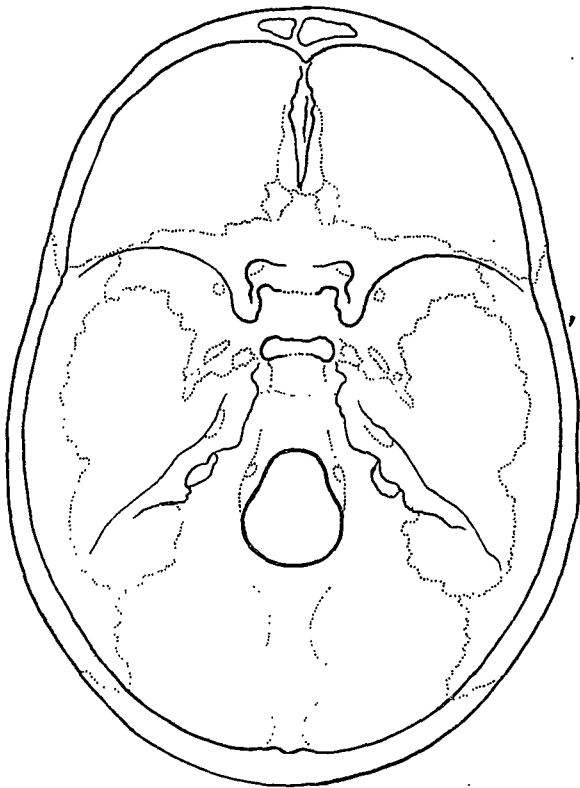
. . . . .

Describe the structure of a Dural Sinus.

Make a drawing of the Dural Sinuses on page 372 and indicate with arrows the direction of their venous flow.

Draw a vertical cross section of the Cavernous Sinus showing the position of its contents, and associated structures.

Review the Ethmoid bone.



INDICATE THE COURSE OF THE CEREBRAL NERVES AND THEIR FORAMINA OF PASSAGE; ALSO THE LOCATION OF THE INTRACRANIAL ARTERIES

X X I V  
C E R E B R A L   N E R V E S

A. TOPIC FOR DISCUSSION. Intracranial topography of the Cerebral Nerves.

B. SPECIAL STUDY

*Nerves: Cerebrales*

I    Olfactorius	VII    Facialis
II   Opticus	VIII   Acusticus
III   Oculomotorius	IX    Glossopharyngeus
IV   Trochlearis	X     Vagus
V    Trigeminus	XI    Accessorius
VI   Abducens	XII   Hypoglossus

C. DIRECTIONS FOR DISSECTION AND STUDY

- ☐ 1. Examine the Bulb and Tract of the Olfactory Nerve (I), then identify their exact relationships to the floor of the Cranium.
- ☐ 2. Try to identify one or two broken ends of the Olfactory Nerves, and briefly describe their course, distribution and sheathing.

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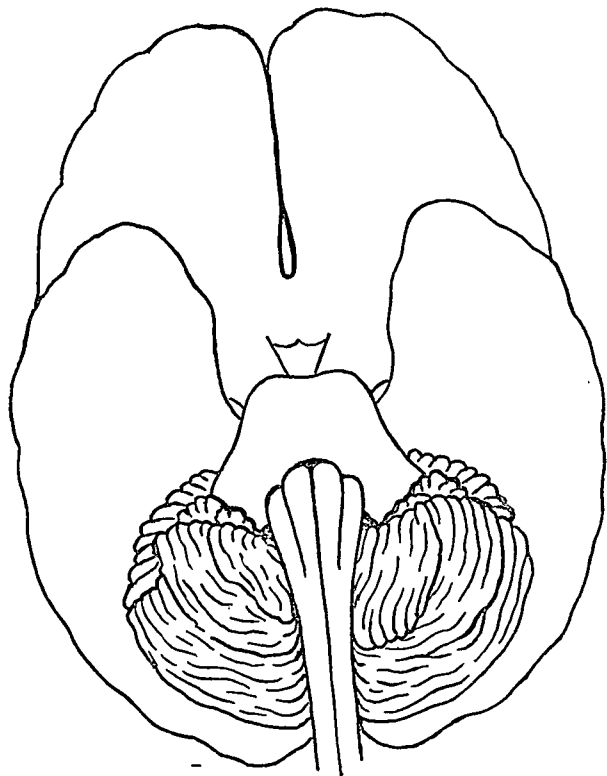
- ☐ 3. Trace the four limbs of the Chiasma of the Optic Nerve (II), in relation to the Brain and cranial floor. Make sketches to show the relationships of structures adjacent to the Chiasma and Optic nerves as viewed from below (against the brain), and from above (against the cranial floor).
- ☐ 4. Briefly describe the sheathing and the course of the Optic Nerve; include the destination of its fibers.

.....

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.....



- ☐ 5. Identify the cut proximal and distal ends of the Oculomotor Nerve (III), noting its course within the Cavernous Sinus. Try to identify its two communicating branches; a, with Cavernous plexus of the Sympathetic, and b, with the Ophthalmic Nerve.

Briefly describe its sheathing, course and destination, making a sketch of its intra-orbital branches.

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 .....  
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- ☐ 6. Locate the cut ends of the Trochlear Nerve (IV). Identify its position on the Brain, and along the lateral wall of the Cavernous Sinus.

Describe its course and destination: .....

.....  
 .....  
 .....

- ☐ 7. Identify the Trigeminal Nerve (V) and its roots (large sensory, and small motor), noting their relative positions to the Brain.

- ☐ 8. Carefully raise the upper layer of Dura to expose the Semilunar Ganglion (Gasserian) and its three divisions, Ophthalmic, Maxillary and Mandibular.

- ☐ 9. Follow the Ophthalmic Nerve forward in the lateral wall of the Cavernous Sinus and try to identify its separation into three branches, Lacrimal, Frontal, and Nasociliary. These branches will be dissected later.

- ☐ 10. Trace the Maxillary Nerve to the Foramen Rotundum. Review the superficial branches of this nerve that have already been identified; the Zygomaticotemporal (in Temporal Fossa), the Zygomaticofacial (on the Zygoma); Infra-orbital and Nasal. Its deeper branches will be dissected later.

- ☐ 11. Follow the Mandibular Nerve to its passage into the Foramen Ovale. Review all its branches as exposed in earlier dissection.

- ☐ 12. Make notes on the relationships and coverings of the Trigeminal roots and the Semilunar Ganglion.

.....  
 .....  
 .....



- ☐ 13. Locate the ends of the Abducens Nerve (VI) identifying their positions to the brain and floor of the skull.

Briefly describe its course, relations and destination.

.....  
 .....  
 .....

- ☐ 14. Identify the two roots of the Facial Nerve (VII) on the Brain and skull, (large motor and small sensory), distinguishing them from the Acoustic Nerve (VIII) by size and position.

Compare the position of the Internal Acoustic Meatus through which they enter the bone, with that of the Stylomastoid Foramen from which the Facial Nerve alone emerges. The intermediate course of the two nerves will be studied later (Ear).

Review the external course and branches of the Facial Nerve as exposed in the earlier work.

- ☐ 15. Identify the relations of the Acoustic Nerve (VIII) on the Brain.

Describe its composition and destination.

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 .....  
 .....  
 .....

- ☐ 16. Identify on the Brain the Glossopharyngeal (IX), Vagus (X), and the Accessory (XI) Nerves, noting the filaments which unite the latter to the Medulla, and the relative positions of the three nerves.

Locate these nerves at their entrance into the Jugular Foramen.

- ☐ 17. Briefly describe the Glossopharyngeal Nerve (IX), its Ganglia, and list its communicating and terminal branches. (It will be dissected later.)

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 .....  
 .....  
 .....

- 18. Try to identify the Jugular Ganglion of the Vagus Nerve lying within the Jugular Foramen. Its branches of communication are:
- With Accessory Nerve (cranial portion)
  - With Glossopharyngeal Nerve (Petrous Ganglion)
  - With Sympathetic Nerve (Superior Cervical Ganglion)

The Ganglion Nodosum lies below the Jugular Foramen. Its branches of communication are:

- With Hypoglossal Nerve
- With Sympathetic Nerve (Superior Cervical Ganglion)
- With the loop between Cervicals 1 and 2

Review the relations of the Vagus Nerve below the base of the skull and along its exposed cervical course.

List the structures which serve as the ultimate points of destination of the fibers of the Vagus Nerve.

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- 19. Review the course and distribution of the Accessory Nerve (XI) and especially its position in the Posterior Triangle of the neck.

Briefly describe its composition and its infracranial relations.

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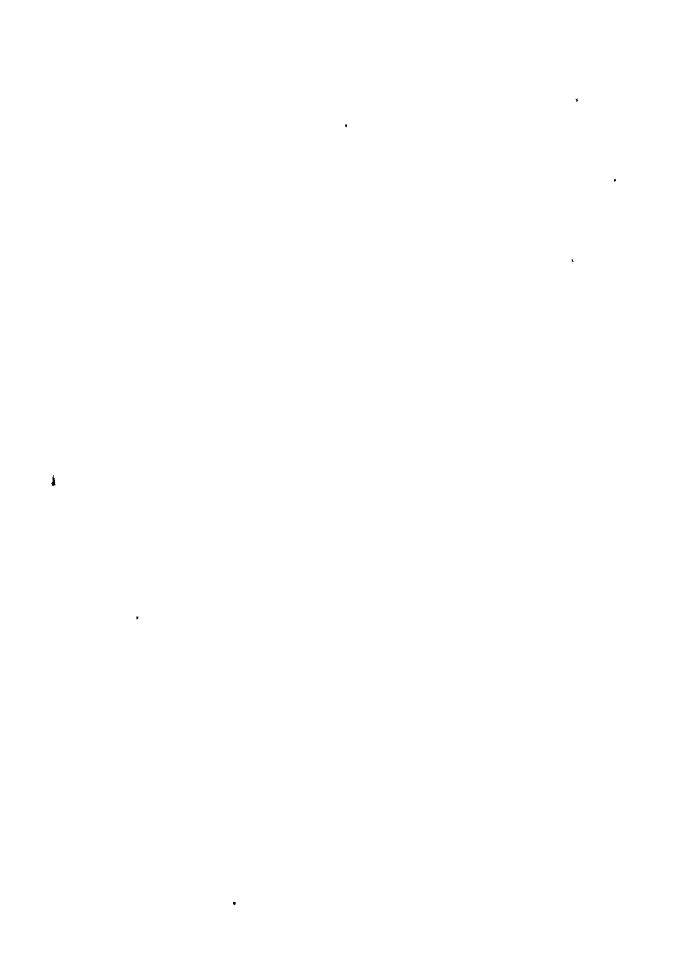
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- 20. Identify the cut ends of the Hypoglossal Nerve (XII) on the Medulla, and at its entrance into the Hypoglossal Canal.

Review the course and relationships of this Nerve below the skull, as have already been exposed.

Its branches of communication are:

- With Vagus Nerve
- With Sympathetic trunk (Superior Cervical Ganglion)
- With loop between Cervicals 1 and 2
- With Lingual Nerve



## POSTPHARYNGEAL STRUCTURES

A. TOPIC FOR DISCUSSION. Deep Cervical Relationships.

### B. SPECIAL STUDY

*Nerves:*

Glossopharyngeus (IX)

Ganglion superius

Ganglion petrosum

Vagus (X)

Ganglion jugulare

Ganglion nodosum

Accessorius (XI)

Ramus internus

Ramus externus

Hypoglossus (XII)

Sympathicus

Ganglia, superius, medius, and inferius

*Arteries:* Carotis interna and branches

*Veins:*

Jugularis interna

Sinus durae matris

### C. DIRECTIONS FOR DISSECTION AND STUDY

Exposure of Postpharyngeal Structures.

- 1. a. In the plane of Prevertebral Fascia, separate by blunt dissection the posterior pharyngeal wall from the vertebral bodies. Be careful not to injure the nerves or blood vessels of the neck as the separation is extended from the thorax to the base of the skull.
- b. Lift all the prevertebral structures forward, including the nerves and vessels, and insert a strip of gauze or sheeting between them and the vertebral column.
- c. Within the skull, locate the opening of the Hypoglossal Canal near the Foramen Magnum. From a point one-quarter inch behind the opening of the canal, draw laterally a straight line on each side, projected along the posterior margin of the Sigmoid Sinus to the cut edge of the skull.
- d. Saw carefully along these lines, first on one side then on the other, to the Foramen Magnum and remove the Occiput.
- e. Observe the course of the Vertebral Arteries through the Foramen Magnum, and identify the position of the External Rami of the Accessory Nerves.
- f. Flex the skull forward strongly to disclose the position of the odontoid process of the Axis against the Membrana tectoria. Cut the latter with an inverted U-shaped incision following the outline of the process, and continue the cuts laterally on the plane of the Atlanto-occipital joint.

g. Anteriorly and laterally, lift away carefully all the vessels and cut the Longus Capitis, Anterior and Lateral Recti muscles, the Anterior Atlanto-occipital Membrane and other ligaments to complete a forward disarticulation of the Occipital bone from the Atlas.

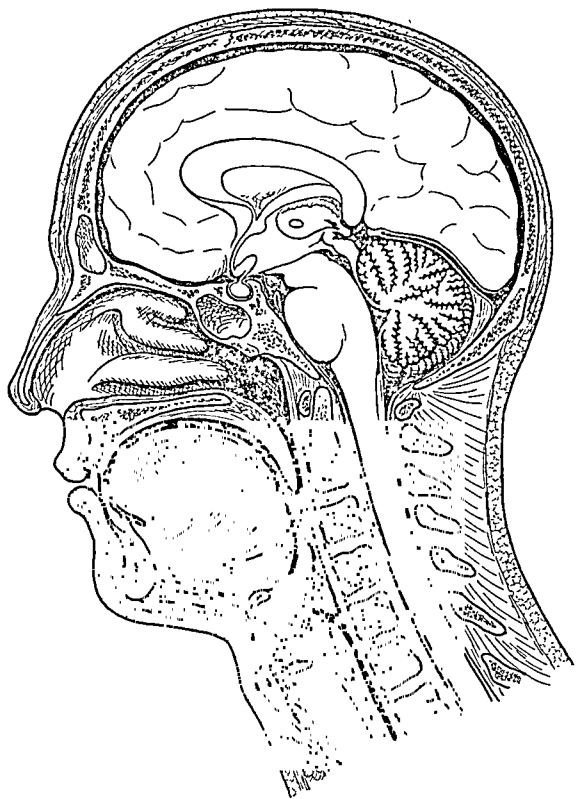
- ☐ 2. Locate the Vagus Nerve and trace it to the Ganglion Nodosum noting its relation to the Jugular Vein and the Internal Carotid Artery.
- ☐ 3. Trace the Sympathetic Trunk from the Middle Cervical Ganglion upward to the Superior Cervical Ganglion. Observe its intimate relation with the sheath of the Internal Carotid Artery and the Internal Jugular Vein.  
Sympathetic branches are supplied to the External Carotid Artery to form a network about the latter, the External Carotid Plexus.
- ☐ 4. Try to trace upward from the Superior Cervical Ganglion the small Jugular Nerve to the Vagus and Glossopharyngeal Nerves; also other branches which enter the Carotid Canal with the Internal Carotid Artery to form the Internal Carotid and Cavernous Plexuses.
- ☐ 5. Pick up the Hypoglossal Nerve in the Mandibular region and trace upward to the Hypoglossal Foramen. Chisel away the bone to open into the foramen, and identify the passage of the nerve and the Meningeal Branch of the Ascending Pharyngeal Artery.
- ☐ 6. Continue chiseling away the Occipital bone carefully to open the Jugular Foramen. Expose the entire course of the Internal Jugular Vein and study its intracranial continuation as the Transverse Sinus; also locate the drainage point of the Inferior Petrosal Sinus.
- ☐ 7. Note the position of the Accessory Nerve to the Internal Jugular Vein. Isolate and trace the Nerve, and note its course in relation to that of the Vein.  
.....  
.....
- ☐ 8. Locate the Glossopharyngeal Nerve while completing the isolation of the Vagus in the Jugular Foramen. Identify the Jugular Ganglion of the Vagus at this point.
- ☐ 9. Try to identify the Superior and Petrous Ganglia of the Glossopharyngeal Nerve, also its ganglionic branches to the Sympathetic and Facial Nerves.
- ☐ 10. The branches of the Glossopharyngeal Nerve are:
 

a. Tympanic (Read up)	d. Pharyngeal	}	for later dissection
b. Carotid (Read up and identify)	e. Tonsillar		
c. Muscular Stylopharyngeus	f. Lingual		

- ☐ 11. Trace the course of the Glossopharyngeal Nerve downward on the posterior surface of the Stylopharyngeus muscle which it supplies.
- ☐ 12. Identify and trace the Posterior Pharyngeal branches of the Glossopharyngeal Nerve and the communication with the Vagus and Sympathetic Nerves.
- ☐ 13. Locate the origin of the Superior Laryngeal Nerve from the Vagus and trace the former downward observing its relations to adjacent structures.
- ☐ 14. Remove any remaining Cervical Fascia from both Internal and External Carotid Arteries. Observe that about one-half inch below the skull, the last four Cranial nerves lie between the Internal Carotid Artery and the Internal Jugular Vein.
- ☐ 15. Review the branches of the External Carotid Artery. Trace the Ascending Palatine Artery from the External Maxillary Artery. The Tonsillar branch lies deeper and may be seen later.

Make sketches showing the Ganglia and communications of the Glossopharyngeal, Vagus, and Sympathetic Nerves.

*Keep the cervical structures well covered and moistened during the subsequent dissections of the head.*



X X V I  
PHARYNGEAL STRUCTURES

A. TOPIC FOR DISCUSSION. Tonsils, Clinical Considerations.

B. SPECIAL STUDY

<i>Muscles:</i>	<i>Innervation</i>
Constrictores pharyngei	Plexus Pharyngeus*
Salpingopharyngeus	
Uvulae	
Pharyngopalatinus	
Glossopalatinus	
Levator veli palatini	Trigeminus Glossopharyngeus
Tensor veli palatini	
Stylopharyngeus	

\* The Pharyngeal Plexus is formed by branches of the Glossopharyngeal, Vagus, and Sympathetic Nerves.

C. DIRECTIONS FOR DISSECTION AND STUDY

- ☐ 1. Chisel away the basilar portion of the Occipital bone to expose the cranial attachment of the Pharynx.
- ☐ 2. Dissect the fascial covering from the posterior and lateral walls of the Pharynx and review completely the Constrictor muscles, their extent and attachments.
- ☐ 3. Split the posterior wall of the Pharynx in midline from its sphenoid attachment to the Oesophagus, and transversely along its superior attachment.
- ☐ 4. Separate the cut edges and identify the following:
 

Choana	Tonsilla Palatina
Concha Nasalis Inferior	Plica Salpingopharyngea
Velum Palatinum	Torus Tubarius
Uvula	Tuba Auditiva (Eustachian)
Arcus Pharyngopalatinus	Epiglottis
Arcus Glossopalatinus	Vallecula Epiglottis
- ☐ 5. Fasten the edges of the flaps laterally (pins) and carefully lift the mucous membrane from the walls of the Nasopharynx, Pharynx, and upper surface of the Soft Palate.
- ☐ 6. Identify the fibers of the Pharyngopalatinus forming the Arcus Pharyngopalatinus or Posterior Pillar of the Pharynx, and the Glossopalatinus forming the Anterior Pillar; also the Musculus Uvulae.



- ☐ 7. Identify the origin of the Salpingopharyngeus from the Cartilage of the Auditory Tube.
- ☐ 8. Expose and isolate the Levator Veli Palatini identifying its action on the Soft Palate.
- ☐ 9. Push the Levator medially and locate with finger the Hamulus of the Sphenoid bone. By blunt dissection identify the tendon of the Tensor Veli Palatini passing under the Hamulus and expose the latter muscle.
- ☐ 10. Locate the position of the orifice of the Auditory Tube to the origins of these muscles. Lift the lateral border of the Tensor and identify the adjacent Internal Pterygoid muscle.
- ☐ 11. Split the skull sagittally one-eighth inch to one side of the midline to preserve the nasal Septum. Continue the splitting by dividing the tongue and the larynx in midline to below the Cricoid cartilage.

## NASOPHARYNX

- ☐ 12. Before proceeding with the dissection, study carefully the topography of the upper respiratory tract. Identify the following:

Concha Nasalis Superior	Tuba Auditiva
Concha Nasalis Media	Torus Tubarius
Concha Nasalis Inferior	Ostium Pharyngeum
Vestibulum Nasi	Tubae Auditivae
Atrium	Tonsilla Pharyngea (Adenoids)
Recessus Sphenoethmoidalis	Fornix Pharyngis
Meatus Nasi Superior	Recessus Pharyngeus
Meatus Nasi Medius	Plica Salpingopharyngea
Meatus Nasi Inferior	Tonsilla Palatina
Palatum Molle and Uvula	Plica Triangularis
Choana	Arcus Pharyngopalatinus
Meatus Nasopharyngeus	Vallecula Epiglottica

- ☐ 13. Note the relations of:
  - a. Hypophyseal Fossa to Sphenoid Sinus
  - b. Tuba Auditiva (Eustachian) to Hard and Soft Palates (floor of nose) and Postpharyngeal wall
  - c. Pharyngeal Tonsil
  - d. Postpharyngeal wall to Vertebral Column

Review the Temporal Bone, and read up the Ear.

A. TOPICS FOR DISCUSSION. Mechanism of Hearing. Body Equilibration.

B. SPECIAL STUDY

Auris externa

Meatus acusticus externus

Auris interna

Labyrinthus osseus

Vestibulum

Canales semicirculares ossei

Cochlea

Labyrinthus membranaceus

Meatus acusticus internus

*Nerves:*

Facialis (VII)

Ganglion geniculatum

Acusticus (VIII)

N. Vestibuli

Ganglion vestibulare

N. Cochleae

Ganglion spirale

*Artery:* Auditiva interna (Basilaris)

C. DIRECTIONS FOR DISSECTION AND STUDY

EXTERNAL EAR

- 1. Identify the following parts on the External Ear:

Helix

Lobulus Auriculae

Apex Auriculae Darwini

Tragus

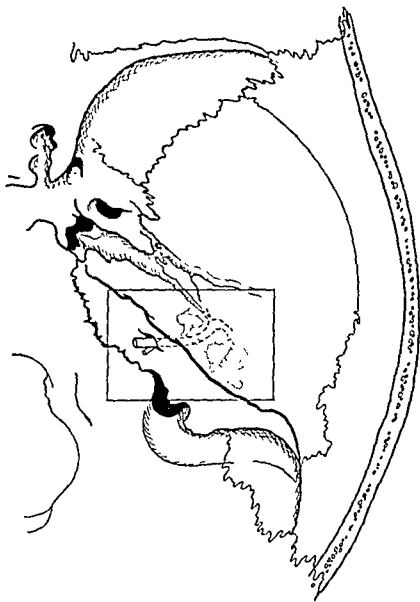
Antihelix

Antitragus

Concha Auriculae

Meatus Acusticus Externus

- 2. Remove the External Ear and dissect out the anterior cartilaginous lining of the External Auditory Meatus, identifying it as the Lamina Tragi; also its deeper inferior extension, as the Processus Triangularis.
- 3. Chisel away very carefully the tympanic portion of the bone until the Tympanic Membrane is visible.

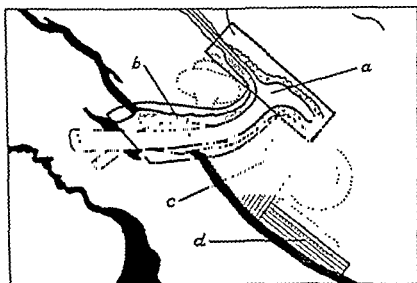


USE THIS SKETCH TO IDENTIFY THE LOCATION OF THE COCHLEA AND CANALS OF  
THE INNER EAR; SEE DETAIL DRAWING ON OPPOSITE PAGE FOR EXPOSURE

- ☐ 4. Identify the position of the Membrane to the axis of the canal; also the position of its plane when the head is held upright. Locate its Stria Malleolaris; also the tense and flaccid portions.
- ☐ 5. Review the Muscles and the Nerve Supply of the External Ear.  
*Motor* Facial (Posterior Auricular branch)  
*Sensory* Greater Auricular, Small Occipital, and Auriculotemporal Of the External Meatus  
*Sensory* Auriculotemporal and Vagus (Auricular branch)

## INTERNAL EAR

- ☐ 6. Within the Cranial Fossa, identify the following structures on the petrous portion of the Temporal bone:
- |                           |                              |
|---------------------------|------------------------------|
| Meatus Acusticus Internus | <i>Nerves</i> Facialis (VII) |
| Eminentia Arcuata         | Acusticus (VIII)             |
| Hiatus Canalis Facialis   |                              |
| Tegmen Tympani            |                              |
- ☐ 7. Starting at the Hiatus of the Facial Canal, lift the thin sheet of bone lateral to the Hiatus for about a half inch; this will uncover the Greater Superficial Petrosal Nerve and expose the Geniculate Ganglion of the Facial Nerve, from which the Greater Superficial Petrosal Nerve originates. (See figure.)
- The Geniculate Ganglion is continued proximally in the Nervus Intermedius and distally in the Chord Tympani.



## PROCEDURE

- a. Remove roof of the Hiatus and Canal to expose the Geniculate Ganglion. b. Continue removal of bone over the course of the Internal Auditory Canal to the Meatus in order to expose Facial and Acoustic Nerves. c. Gradually chisel away bone (chisel held in position of the parallel lines) to open the Superior Semicircular Canal. d. Similarly, chisel away bone to expose the Posterior Semicircular canal.

- ☐ 8. Having located the Ganglion, chisel away a narrow strip (not over one-quarter inch wide) across the crest of bone between the Ganglion and the Internal Auditory Meatus to expose the course of the Canal enclosing the Facial and Acoustic Nerves, and the Internal Auditory branch of the Basilar Artery. The Facial Nerve lies uppermost.
- ☐ 9. Try to identify on the Ganglion a small branch going to the Lesser Superficial Petrosal Nerve; it connects the Geniculate with the Otic Ganglion.
- ☐ 10. Continue to follow the Facial Nerve laterally by chipping away the surface of the Tegmen Tympani to open into the underlying Tympanic Cavity of the Middle Ear.
- ☐ 11. Similarly, carefully chip away the bone medially to trace the Cochlear division of the Acoustic Nerve into the Cochlea of the Inner Ear.
- ☐ 12. Trace its Vestibular division laterally into the Vestibule of the Inner Ear, whence it continues into the Semicircular Canals located beneath the Arcuate Eminence.
- ☐ 13. Working laterally from the cut over the Internal Acoustic Canal, carefully chisel away the medial half of the Arcuate Eminence to expose the Superior Semicircular Canal which lies in a vertical plane at right angles to the Petrosal Ridge.
- ☐ 14. Extend the cut forward to uncover the Vestibule, then laterally, chip away the bone to expose the Lateral Semicircular Canal noting its horizontal plane.
- ☐ 15. Chisel away the posterior wall of the Petrous portion of the Temporal bone, below and lateral to the Superior Semicircular Canal, to expose the Posterior Semicircular Canal.
- ☐ 16. Study the exact positions of these Canals, the Vestibule and the Cochlea.

**Briefly describe:**

**OSSEOUS LABYRINTH**

**Vestibule**

**Semicircular Canals**

**Cochlea**

**MEMBRANOUS LABYRINTH**

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X X V I I I  
E A R ( C O N T I N U E D )

A. SPECIAL STUDY

*Auris Media:*

Cavum tympani

Tuba auditiva

Ossiculæ auditus

*Muscles:*

Tensor tympani

Stapedius

*Nerves:*

Facialis (VII)

Chorda tympani

Plexus tympanicus

B. DIRECTIONS FOR DISSECTION AND STUDY

- ☐ 1. Remove the Lateral Semicircular Canal to follow the lateral course of the Facial Nerve.
- ☐ 2. Posteriorly and laterally to the Semicircular Canals, extend the removal of bone to open widely the Mastoid Antrum and Cells, noting their relation to the Middle Ear and their proximity to the Sigmoid Sinus.
- ☐ 3. Widen the entrance into the Tympanic Cavity in order to locate and study the Auditory Ossicles, the orifice of the Auditory Tube (Eustachian), the Pyramid and the inner surface of the Tympanic Membrane.
- ☐ 4. Study the Auditory Ossicles, Malleus, Incus and Stapes for their relationship to each other and adjacent structures. (Do not remove them yet.)
- ☐ 5. Locate and carefully expose the following muscles:

Tensor Tympani.....

.....

..... Nerve.....

Stapedius.....

.....

..... Nerve.....



- ☐ 6. In order to identify and preserve the origin and course of the Chorda Tympani, continue carefully to trace the downward course of the Facial Nerve to its exit through the Stylomastoid Foramen. The Chorda Tympani emerges through a foramen near the inner end of the Petrotympanic Fissure.
- ☐ 7. Exteriorly, enlarge the External Auditory Meatus and remove the Membrane and Ossicles after studying their position to the External Ear.
- ☐ 8. Identify the Fenestra Ovalis (F. Vestibuli) opening into the Vestibule and occupied by the foot plate (base) of the Stapes; the Fenestra Rotunda (F. Cochleae) closed by the membrane from the cavity of the Cochlea; also the intervening Promontorium, a projection of the wall of the first coil of the Cochlea.
- ☐ 9. The Tympanic Plexus, located on the medial wall of the Middle Ear, is formed from branches of the Glossopharyngeal, Sympathetic (Carotid Plexus) and Otic Ganglion of the Trigeminal Nerves.  
Its branches are given off as follows:
  - a. to the Fenestra Ovale
  - b. to the Fenestra Rotunda
  - c. to the Internal Auditory Tube (Eustachian)
- ☐ 10. Try to expose the course of the Chorda Tympani within the Temporal bone. Does the Chorda Tympani contribute to the ear mechanism, and what is its ultimate destination?  
.....  
.....  
.....
- ☐ 11. The blood supply to the Tympanum comes from five different sources (read up):
  - a. Stylomastoid branch of the Posterior Auricular Artery
  - b. Tympanic branch of the Internal Maxillary Artery
  - c. Middle Meningeal branch of the Internal Maxillary Artery
  - d. Ascending Pharyngeal Artery
  - e. Internal Carotid Artery

## TYMPANIC MEMBRANE

TYMPANIC (mastoid) ANTRUM

AUDITORY TUBE (Eustachian)

Make a sketch showing the roots and branches of the Tympanic Plexus, and other nerves of the Ear.

**Mechanism of Hearing.**

x x i x  
ORBIT AND EYE

A. TOPICS FOR DISCUSSION. Nerves and Blood Vessels of the Orbit.

B. SPECIAL STUDY

*Nerves:*

Opticus (II)  
Oculomotorius (III)  
Trochlearis (IV)  
Ophthalmicus (Trigeminus V)  
Ganglion ciliare  
Abducens (VI)

*Arteries:* Ophthalmica and branches

*Veins:*

Ophthalmica superior  
Ophthalmica inferior

Glandula lacrimalis

C. DIRECTIONS FOR DISSECTION AND STUDY

- ☐ 1. a. Remove the Dura Mater from above the roof of the Orbit. Draw a line from the Optic Foramen forward about one-fourth inch lateral to the Crista Galli, and a second line from the lateral end of the Superior Orbital Fissure obliquely forward and laterally corresponding to the lateral boundary of the orbit. Connect these lines anteriorly with a transverse curved one following the contour of the Frontal bone.  
b. Inject the eyeball to restore its normal contour if necessary.
- ☐ 2. Make a small opening with a chisel in the middle of the roof of the orbit, and identify the underlying Periorbita (periosteal lining of the orbit).
- ☐ 3. Push the Periorbita downward separating it from the roof, and chisel away the latter within the marked-off area including the thick upper margins of the Superior Orbital Fissure and the Optic Foramen. Preserve the Periorbita uninjured and do not cut into the Lamina Cribrosa.

*Note:* Occasionally the Frontal Sinus extends deeply backward within the roof of the Orbit, giving its roof a double bony layer. In such cases, observe the extent of the Sinus while chiseling away both plates.

# ORBIT AND EYE

400

- ☐ 4. Observe the course of the Frontal Nerve visible through the Periorbital, and cut the membrane (with scissors) directly over the nerve. Then make transverse cuts following the anterior chiseled edge of the orbital roof. Reflect flaps and note the distribution of fat in which the orbital structures are imbedded.
- ☐ 5. Starting at the Semilunar Ganglion, trace the Ophthalmic Nerve to the Superior Orbital Fissure and identify the origins of its three branches.
  - a. Frontal (superior course)
  - b. Lacrimal (lateral course)
  - c. Nasociliary (medial and deeper course)
- ☐ 6. Follow the Frontal Nerve (the chief prolongation of the Ophthalmic Nerve) and its two branches, lying on the Levator Palpebrae Superioris.
  - a. Supraorbital (continuing forward)
  - b. Supratrochlear (curving medially) } See following paragraphs.
- ☐ 7. Trace the Supraorbital Nerve and the adjacent Supraorbital branch of the Ophthalmic Artery, to the Supraorbital Foramen. Small branches are given off to the upper lid. Review its terminal branches on the forehead. Note the continuity of the Superior Ophthalmic Vein with the Cavernous Sinus.
- ☐ 8. Follow the Supratrochlear Nerve to the pulley (trochlea) of the Superior Oblique muscle. Review its external terminal branches. Curving around the pulley, a descending twig communicates with the Infra-trochlear branch of the Nasociliary Nerve.
- ☐ 9. Trace the Trochlear Nerve (IV) along the lateral wall of the Cavernous Sinus and through the Superior Orbital Fissure to its innervation of the Superior Oblique muscle. Note its superior position to the other ocular nerves as it crosses them. Try to identify its small branches of communication with:
  - a. Ophthalmic
  - b. Lacrimal
  - c. Cavernous plexus of the Sympathetic
- ☐ 10. From its origin, trace the Lacrimal Nerve through the orbital fat to the Lacrimal Gland. Near the Gland a communicating branch extends downward deeply to the Zygomatic nerve of the Maxillary division (V), within the orbit.
- ☐ 11. Obtain a good exposure of the Gland to judge its size and location, identifying the Lacrimal vessels.
- ☐ 12. Displace the Frontal Nerve, and test the action of the Levator Palpebrae Superioris upon the eyelid. Divide the muscle and while reflecting the posterior half, identify the small nerve branch entering its under surface from the Oculomotor Nerve (III).





- ☐ 13. Carefully cut the underlying Superior Rectus Muscle at the same point, and as the posterior half of the muscle is reflected, identify its innervation by the upper division of the Oculomotor Nerve.
- ☐ 14. The Nasociliary Nerve (from Ophthalmic N.) should now be dissected with care in order to identify its branches. At the same time, the Ophthalmic Artery and the Superior Ophthalmic Vein should be exposed.  
The branches of the Nasociliary Nerve are:
- Long Root of the Ciliary Ganglion (the latter will be seen later located between the Optic Nerve and the Lateral Rectus).
  - Long Ciliary Nerves (Nn. Ciliares Longi) following the Optic Nerve to the Eyeball.
  - Infratrochlear Nerve, running along the Superior Oblique to the pulley—communication with the Supratrochlear Nerve.
  - Ethmoidal Nerves, to the Ethmoid Cells and Sphenoidal Sinus. Expose by cutting the Superior Oblique and reflecting.
- ☐ 15. The Ophthalmic Artery enters the orbit through the Optic Foramen with the Optic Nerve, to the outer side of, and beneath, the latter. It then swings upward and medially, crossing the Optic Nerve toward the nasal side. It supplies all orbital and ocular structures.
- ☐ 16. Identify its orbital branches, and the external prolongation of those marked with an asterisk (\*):
- |  |                     |
|--|---------------------|
| a. Lacrimal                            | d. Medial Palpebral |
| b. Supraorbital*                       | e. Frontal*         |
| c. Posterior and Anterior<br>Ethmoidal | f. Dorsal Nasal*    |
- ☐ 17. The Lacrimal Artery supplies blood on the lateral side of the orbit, as does the Ophthalmic Artery on the nasal side. In addition to supplying the Lacrimal Gland, it gives off the following orbital branches. Try to identify:
- Recurrent Anastomotic branch to the Middle Meningeal A
  - Zygomatic branch (to Temporal Fossa—through the Zygomatic-temporal Foramen)
  - Zygomatic branch (to surface of the Malar Bone, through the Zygomatico-facial Foramen)
  - Lateral Palpebral
- ☐ 18. The arteries to the Eyeball are small, but the effort should be made to locate and identify the ones marked (\*):
- Centralis Retinae (traversing the center of the Optic Nerve)
  - Ciliares Longi\* (two)
  - Ciliares Breves\* (surrounding the Optic Nerve)
  - Ciliares Antiores (on anterior portion of eyeball)



- ☐ 19. Carefully separate the Lateral Rectus muscle and the Optic Nerve near the apex (posterior point) of the orbit and locate the Ciliary Ganglion. Try to identify its three roots (posteriorly):
- a. Long Root (from Nasociliary Nerve) *Sensory*
  - b. Short Root (from Oculomotor Nerve) *Motor*
  - c. Sympathetic Root (from the Cavernous Plexus)
- Anteriorly, it gives off the Short Ciliary Nerves which enter the eyeball in the circle formed by the Short Ciliary Arteries about the Optic Nerve.
- ☐ 20. Locate the Abducens Nerve (VI) on the medial surface of the proximal end of the Lateral Rectus muscle. By slight traction, identify its continuity with the free intracranial stem; then trace its course backward between the two heads of the Lateral Rectus and through the Superior Orbital Fissure.
- ☐ 21. Observe that its passage through the Fissure and between the two heads of the muscle is the same as that of the Nasociliary and Oculomotor Nerves, and the two Ophthalmic Veins.
- ☐ 22. Cut carefully the Optic Nerve close to its Foramen and reflect. Expose the inferior branch of the Oculomotor Nerve lying upon the Inferior Rectus muscle. Identify its branches to the Medial and Inferior Recti, and the Inferior Oblique muscles.
- ☐ 23. Locate and trace the Inferior Ophthalmic Vein to the Cavernous Sinus. At times it sends a tributary branch through the Inferior Orbital Fissure to the Pterygoid Plexus.
- ☐ 24. Review all the Ocular muscles, their action, and nerve supply.

Review and list the bones forming the Orbit.

x x x  
ORBIT AND EYE (CONTINUED)

A. TOPIC FOR DISCUSSION. Mechanism of Sight.

B. SPECIAL STUDY

*Nerve:* Maxillaris (Trigeminus V)

*Artery:* Infraorbitalis

Fascia bulbi

Bulbus oculi

Ductus nasolacrimalis

Saccus lacrimalis

C. DIRECTIONS FOR DISSECTION AND STUDY

- ☐ 1. Examining the eye externally, identify the following:

Lacus Lacrimalis

Plica Semilunaris

Papilla Lacrimalis

Conjunctiva

Punctum Lacrimale

Cornea

Coruncula Lacrimalis

Palpebral Commissures

- ☐ 2. Remove the Orbicularis Oculi, working from the orbital margins toward the edges of the lids, and identify:

Palpebral Vessels, also branches of the Lacrimal and Infratrochlear Nerves

Lateral Raphe, Medial Ligament

Tendinous Fibers of the Levator Palpebrae Superioris

Tarsi, Superior and Inferior

- ☐ 3. Cut the Tarsi midsagittally and reflect to identify:

Tarsal Glands (Meibomian)

Fornix Conjunctivae (superior and inferior)

Lacrimal Gland (inferior portion)

Lacrimal Sac

Nasolacrimal Duct (by probe through a cut in Lacrimal Sac)

- ☐ 4. Following the margins of the orbit, cut the Orbital Septum, an extension of the Periorbital upon the lid and ocular structures; also divide the uncut ocular muscles about a half inch from their origin and remove the eyeball and lids *en masse*.

- ☐ 5. Locate the Inferior Orbital Fissure, and under the Periorbital trace the Zygomatic Nerve from the Maxillary division (V), and its two branches, Zygomaticotemporal and Zygomaticofacial, to their foramina of exit (corresponding names). They are followed by branches of the Lacrimal Artery.



- ☐ 6. Locate the **Inferior Orbital Artery** from Part III of the Internal Maxillary Artery, and the **Infraorbital Nerve** of the Maxillary division (V); both enter by the Inferior Orbital Fissure and run subperiosteally in the Infraorbital Groove on the floor of the orbit.

**EYEBALL**

- ☐ 7. With scissors make a circular cut through the Conjunctiva slightly beyond the margin of the Cornea and reflect it with the immediately underlying anterior border of the Fascia Bulbi. Observe the passage of the tendons of the Ocular muscles through the Fascia and their union to the eyeball.
- ☐ 8. Cut away the lids and continue reflection of the Fascia Bulbi until the eyeball is completely exposed. Note the extensions of the Fascia upon the tendons of the muscles during the reflection.
- ☐ 9. Locate on the Eyeball the stems of:
- Optic Nerve
  - Short Ciliary Arteries and Nerves
  - Long Ciliary Arteries and Nerves
  - Anterior Ciliary Arteries
  - Venae Vorticosae
- Read in textbook of their distribution, and draw diagrams.

**NASOLACRIMAL DUCT**

- ☐ 10. Locate the Lacrimal Groove or Fossa lying along the union of the Lacrimal and Maxillary bones at the antero-medial margin of the orbit, and which lodges the Lacrimal Sac.
- ☐ 11. From this Fossa trace the downward course of the Nasolacrimal Canal by chiseling away its anterior (Maxillary) wall to its opening into the inferior meatus of the Nasal Cavity.
- ☐ 12. Identify the size, direction and shape of the Canal; also identify its membranous lining which forms the Nasolacrimal Duct, as a continuation of the Lacrimal Sac.

Use the Eyeball for sectioning and review as directed in the First Dissection.

**TARSAL GLANDS (Meibomian)**

## LACRIMAL APPARATUS





X X X I  
PARANASAL SINUSES

A. TOPICS FOR DISCUSSION. Development and Disorders.

B. SPECIAL STUDY

Sinus frontales

Sinus maxillares (Antrum of Highmore)

Sinus sphenoidales

Cellulae ethmoidales

C. DIRECTIONS FOR DISSECTION AND STUDY

FRONTAL SINUS

- ☐ 1. Chisel away the external plate of the skull between the Supraorbital ridges to expose the extent of the Frontal Sinus of each side.
- ☐ 2. Observe the position of the septum and the degree of asymmetry. Also the thickness and character of the membranous lining and the presence of secretion.
- ☐ 3. Locate with a probe the Frontonasal Duct which leads into the anterior portion of the middle meatus of the Nasal Cavity.

MAXILLARY SINUS

- ☐ 4. Chisel away the entire anterior wall of the Maxillary Sinus, noting whether it involves the Malar bone.
- ☐ 5. Observe the presence of secretion and the membranous lining. Extend the cut laterally to obtain a clear view of the medial wall.
- ☐ 6. Compare its lower level with the floor of the nose, noting conical projections of dental roots, or their entrance into the floor of the sinus.
- ☐ 7. Identify the ridge on its roof marking the course of the Infraorbital Canal.
- ☐ 8. Locate and probe the opening of the Maxillary Sinus into the middle meatus of the Nasal Cavity, by one or two small apertures.
- ☐ 9. Posteriorly, in the Pterygopalatine Fossa, locate the third portion (Sphenomaxillary) of the Internal Maxillary Artery and try to trace its deeper branches.
  - a. Posterior Superior Alveolar.
  - b. Infraorbital; trace through the Inferior Orbital Fissure and the floor of the orbit to its exit on the Maxilla.
  - c. Descending Palatine; identify only its origin prior to its entrance into the Pterygopalatine Canal.
  - d. Sphenopalatine; locate deeply its origin and entrance into the Sphenopalatine Foramen (at the union of the Sphenoid and Palatine bones) going to the roof of the Nasal cavity.
  - e. Artery of the Pterygoid Canal (Vidian) must be looked for later.



- ☐ 10. Try to locate the passage of the Maxillary Nerve across the Pterygopalatine Fossa from the Foramen Rotundum to enter the Inferior Orbital Fissure as the Infraorbital Nerve.

#### SPHENOID SINUS

- ☐ 11. Observe their location, number and size; also, note the character of their membrane and whether they protrude into the Occipital bone.
- ☐ 12. Locate the aperture in the anterior wall, leading into the Sphenoethmoidal Recess of the Nasal Chamber.

#### ETHMOID CELLS

- ☐ 13. Locate the lateral surface of the Ethmoid bone on the medial wall of the Orbit. Carefully chisel away that surface to disclose the three groups of Ethmoid Cells, Anterior, Middle and Posterior.
- ☐ 14. Their openings into the Nasal Cavity should be identified on the opposite (medial) wall, by means of a probe. These cells are contained in the Labyrinth or Lateral Masses of the Ethmoid Bone.

Briefly describe below and on page 410 the Paranasal Sinuses.

Review the Ethmoid, Palatine, Vomer and Inferior Nasal Concha.

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NASOPHARYNX AND PALATE

A. TOPIC FOR DISCUSSION. Upper Air Passages.

B. SPECIAL STUDY

Cavum nasi  
Palatum durum  
Palatum molle

*Nerves:*

Olfactorius I  
Maxillaris (Trigeminus V)

*Arteries:*

Ethmoidales, anterior and posterior  
Sphenopalatina  
Palatina descendens

*Veins:* (Corresponding)

C. DIRECTIONS FOR DISSECTION AND STUDY

NASAL SEPTUM

- ☐ 1. Identify the boundaries of the Nasal Septum and its posterior extent in relation to the Palate.
- ☐ 2. At the posterior border of the Septum, identify the Posterior Nasal Septal Branch of the Sphenopalatine Artery and the Nasopalatine Nerve beside it.
- ☐ 3. At the upper margin, identify the cut ends of the Anterior and Posterior Ethmoidal Arteries from the Ophthalmic.
- ☐ 4. Carefully lift the Mucoperiosteum from the Septum reflecting it downward and forward to trace the course of these arteries, and at the same time identify and trace:
  - a. Filaments of the Olfactory Nerve (their distribution)
  - b. Nasopalatine Nerve, from the Sphenopalatine Ganglion
  - c. Nasal branch of the Anterior Ethmoidal Nerve, from the Nasociliary Nerve
- ☐ 5. After denuding the Septum, identify its component parts (Cartilage, Perpendicular Plate of the Ethmoid, and Vomer) and their exact location.



- ☐ 6. A more perfect exposure of the Septal Vessels and Nerves may now be obtained by carefully removing the bone and cartilage of the Septum from its opposite mucoperiosteal covering. In doing this, try to identify the passage of the Nasopalatine Nerve and a branch of the Sphenopalatine Artery through the Incisive Canal of the Hard Palate to the roof of the mouth.
- ☐ 7. Cut the Septal membrane along its upper borders and reflect downward.

#### LATERAL NASAL WALL

- ☐ 8. Lift the Mucoperiosteum along the superior margin of the lateral wall, to identify the filaments of the Olfactory Nerve and the location and course of the Posterior Ethmoidal Artery.
- ☐ 9. Also, along the Nasal margin locate the Anterior Nasal branches of the Anterior Ethmoidal Nerve (Nasociliary) and Lateral Nasal branches of the Anterior Ethmoidal Artery.
- ☐ 10. Near the posterior end of the Middle Concha (Turbinate) try to locate the Sphenopalatine Artery. Lift the Mucoperiosteum from the medial surface of the Middle and Inferior Concha to trace its branches anteriorly, accompanied by the Lateral branches of the Nasopalatine Nerves.
- ☐ 11. Sketch the nerve and blood supply of the Nasal Cavity (septal and lateral walls), noting especially their points of entrance into the cavity and their source. (Nose bleeding.)
- ☐ 12. Cut away the Superior Concha and identify the small openings into the Posterior Ethmoid Cells.
- ☐ 13. Cut away the Middle Concha and identify the Bulla Ethmoidalis and the Hiatus Semilunaris.
- ☐ 14. Locate in the Middle Meatus the openings from the following Air Spaces:

Middle Ethmoid Cells	Frontal Sinus
Anterior Ethmoid Cells	Maxillary Sinus
- ☐ 15. Cut away the Inferior Concha and open the course of the Nasolacrimal Canal from the Inferior Meatus to the orbit.
- ☐ 16. Insert a probe into the Auditory Tube. Review the relations of the Palatine muscles to the Tube.
- ☐ 17. Locate (by palpation with the finger) a depression in the postero-lateral corner of the Hard Palate just medial to the position of the third molar tooth. This is the site of the Greater Palatine Foramen through which the Anterior Palatine Nerve and Descending Palatine Artery make their exit to the roof of the mouth.

- ☐ 18. Carefully raise the mucous membrane from the under surface of the Hard Palate to trace the anterior course of this Nerve and Artery, noting their anastomoses at the Incisive Canal with the Nasopalatine Nerve and the Sphenopalatine Artery of the Septum.
- ☐ 19. Similarly, try to identify the Posterior Palatine Nerves and Lesser Palatine Artery to the Soft Palate; also the exit of the former through the Smaller Palatine Foramina.

Review the Vomer, and Turbinated bone; also study the cartilages of the Nose.

X X X I I  
SPHENOPTERYGOID REGION

A. TOPIC FOR DISCUSSION. Important Topographic Relationships.

B. SPECIAL STUDY

*Nerves:*

Trigeminus (V)

Ganglion semilunare (Gasseri)

N. Maxillaris

Ganglion sphenopalatinum

N. Canalis pterygoidei (Vidii)

N. Mandibularis

Ganglion oticum

N. Ophthalmicus

Chorda tympani (Facialis VII)

*Arteries:*

Carotis interna

Palatina descendens

A. Canalis pterygoidei (Vidii)

*Veins: Comites*

Sinus cavernosus

Hypophysis cerebri

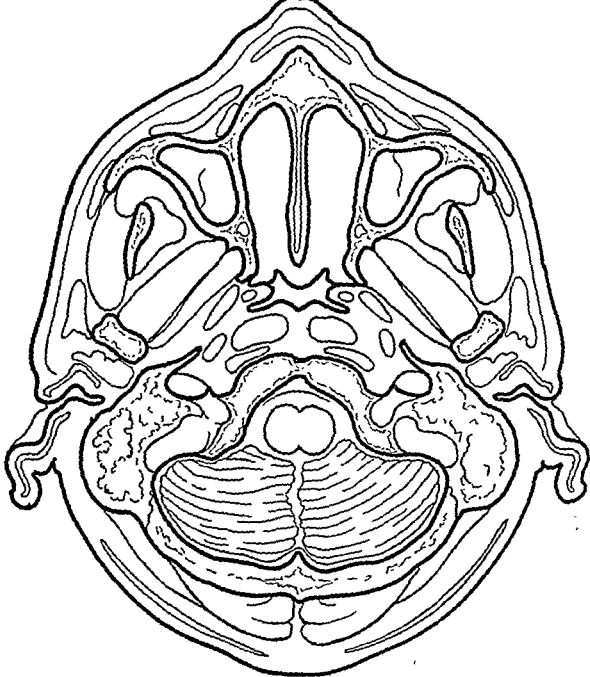
C. DIRECTIONS FOR DISSECTION AND STUDY

- ☐ 1. Complete removal of the Mucoperiosteum in the posterior portion of the Nasal Cavity. Insert a bent probe into the Palatine Foramen, and immediately above the plate of the Hard Palate, push medially the thin plate of bone forming the lower part of the nasal wall of the Pterygopalatine Canal.
- ☐ 2. After locating the Canal in this manner, chip away its entire medial wall working upward, to expose the Palatine Nerves and the Descending Palatine Artery.
- ☐ 3. In the upper end of the Canal and about on a level with the floor of the Sphenoid Sinus, the Sphenopalatine Ganglion will be located. Carefully make an ample exposure.
- ☐ 4. Continue to chip away the portion of the Sphenoid bone below the Sinus, to open into the Pterygoid Canal which (running antero-posteriorly) lies immediately beneath the floor of the Sphenoid Sinus and about one-quarter inch lateral to the mid-sagittal plane of the skull.



- ☐ 5. In this Canal lies the Vidian Artery and the Vidian Nerve. The latter is formed by the junction of Greater Superficial Petrosal Nerve (chiefly sensory with some visceral efferent fibers) from the Intermedius of the Facial (VII), with the Deep Petrosal Nerve (sympathetic) from the Carotid Plexus. It is joined by a small branch from the Otic Ganglion.
- ☐ 6. Locate the entrance of the Internal Carotid Artery into the Carotid Canal, and chisel away the medial portion of the Petrous bone to expose its course to the Cavernous Sinus. Trace the artery through the Sinus reviewing its course and point of exit into the cranial cavity.
- ☐ 7. Carefully cut the Internal Carotid Artery at its entrance into the Sinus and reflect to trace the Greater Superficial Petrosal branch of the Vidian Nerve to the Hiatus of the Facial Canal.
- ☐ 8. Review all the structures associated with the Cavernous Sinus; also the Hypophysis Cerebri.
- ☐ 9. Separate the Dura of the medial wall of the Cavernous Sinus from the Sphenoid bone, then carefully chisel away the anterior, posterior, and lateral walls of the Sphenoid Sinus to remove the medial wall of the Foramen Rotundum.
- ☐ 10. Trace the Maxillary Nerve through the Foramen Rotundum, identifying its two short sensory roots to the Sphenopalatine Ganglion.
- ☐ 11. Follow it forward through the Inferior Orbital Fissure, where it continues as the Infraorbital Nerve, previously studied.
- ☐ 12. Review the branches of the Maxillary division of the Trigeminal Nerve:
  - a. Middle Meningeal
  - b. Sphenopalatine
  - c. Posterior Superior Alveolar
  - d. Zygomatic (Zygomaticofacial, Zygomaticotemporal)
  - e. Infraorbital (including the Anterior and Middle Superior Alveolar)
- ☐ 13. Cut away the origins of the Levator and Tensor Veli Palatini, also the cartilage of the Auditory Canal.
- ☐ 14. Identify the stem of the Trigeminal Nerve (V) and the Semilunar Ganglion in the cranial fossa; then chisel away carefully the medio-posterior wall of the Foramen Ovale to uncover the Mandibular Nerve.
- ☐ 15. On the medial side of the Mandibular Nerve locate the smaller Motor root, and work out the Otic Ganglion, identifying its branches. The Ganglion lies just below the union of the Motor root with the Mandibular Nerve.





CROSS SECTION THROUGH CRANIUM IMMEDIATELY ABOVE THE FLOOR OF THE NOSE

Identify the following—

Orbicularis Oris  
 Quadratus Labii Superioris  
 Caninus  
 Zygomaticus  
 Masseter  
 Temporal

External Pterygoid  
 Internal Pterygoid  
 Parotid Gland  
 Nasopharynx  
 Maxillary Sinus  
 Tensor Veli Palatini

Levator Veli Palatini  
 Longus Capitis  
 Rectus Capitis Anterior  
 Trapezius  
 Semispinalis Capitis  
 Splenius Capitis

Locate the position of, and identify the following—

*Arteries*

External Maxillary  
 Superficial Temporal  
 Middle Meningeal  
 Internal Carotid  
 Internal Maxillary  
 Descending Pharyngeal  
 Vertebral  
 Occipital

*Veins*

Anterior Facial  
 Posterior Facial  
 Internal Jugular  
 Occipital  
 Transverse Sinus

*Nerves*

Mandibular  
 Auriculotemporal  
 Glossopharyngeal  
 Accessory  
 Hypoglossal  
 Facial  
 Greater Occipital  
 Palatine

- ☐ 16. Identify the origin of the Lingual Nerve; then trace the Chorda Tympani from the Facial Nerve to its union with the Lingual Nerve.
- ☐ 17. Study the relationship of the Internal Pterygoid muscle with its adjacent structures.

Make sketches of the Sphenopalatine and Otic Ganglions, their roots and branches.

Review the Trigeminal nerve in its entirety, including the exact position and relationships of its Semilunar Ganglion.

Review all the Cranial Nerves; their foramina of passage through the floor of the skull, and their distribution. List the ones that have communication with the Sympathetic Nerve, and note by what means that communication is accomplished.



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MOUTH, TONGUE AND LARYNX

A. TOPIC FOR DISCUSSION. Important Topographic Relationships.

B. SPECIAL STUDY

*Nerves:*

Mandibularis (Trigeminus V)

Ganglion oticum

Ganglion submaxillaris

N. Lingualis

Glossopharyngeus (IX)

Laryngeus superior (Vagus X)

Recurrrens (Vagus X)

*Arteries:*

Lingualis

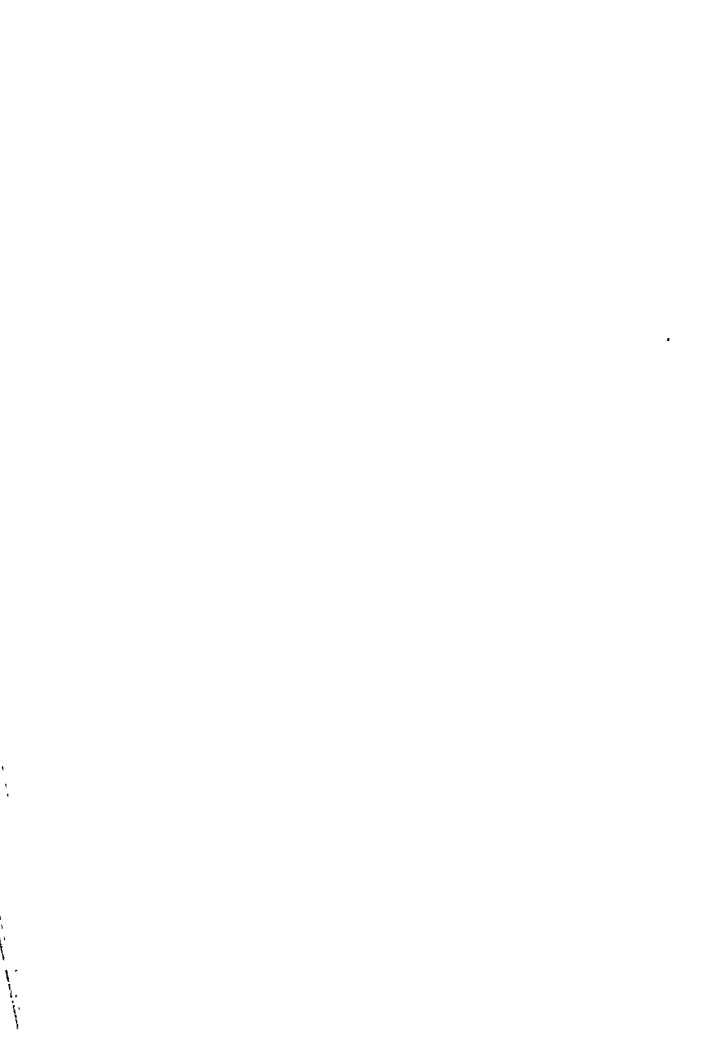
of Tonsils

of Larynx

*Veins:* Lingualis

C. DIRECTIONS FOR DISSECTION AND STUDY

- ☐ 1. Remove the mucous membrane from the lateral wall of the Pharynx (tonsillar region) and from the sides and base of the Tongue.
- ☐ 2. Lift the tongue medially and expose the Sublingual Gland, Submaxillary Duct, and course of the Lingual Nerve.
- ☐ 3. Cut along the union of the Soft and Hard Palates, and reflect the former backward to trace the Lingual Nerve, identifying its relation to the Internal Pterygoid muscle. Trace its subsequent course externally.
- ☐ 4. Locate the Submaxillary Ganglion lying between the Lingual Nerve and the Submaxillary Gland. Identify its roots and branches and make a sketch.
- ☐ 5. Lifting the lateral Pharyngeal wall, locate the numerous small blood vessels immediately lateral to the tonsillar area. They include:
  - Ascending Palatine (External Maxillary)
  - Tonsillar Rami (External Maxillary)
  - Ascending Pharyngeal (External Carotid)
  - Branches from Dorsalis Linguae (Lingual)



- ☐ 6. Locate the Styloglossus muscle, and identify the Stylohyoid Ligament following along its lateral border. Trace the Ligament upward to the Styloid process, then downward into the Base of the Tongue.
- ☐ 7. Trace the course of the Glossopharyngeal Nerve into the Tongue.
- ☐ 8. Carry the dissection more deeply to expose the entrance of the Hypoglossal Nerve into the inferior surface of the Tongue structure medial to the Stylohyoid muscle and Submaxillary Gland.
- ☐ 9. Separate the Genioglossus and Geniohyoid muscles to locate the distal portion of the Hypoglossal Nerve. Also expose the Lingual Artery and trace it posteriorly to the External Carotid.
- ☐ 10. Note the nature and function of the following nerves:

Lingual.....

.....

Glossopharyngeal.....

.....

Hypoglossal.....

.....

- ☐ 11. Trace the course of the Lingual Vein. Also, identify the Thyroglossal Duct and Foramen Caecum, if present. Define them.
- ☐ 12. Review the Submaxillary and Sublingual Glands, their blood and nerve supply.
- ☐ 13. Review the papillae and musculature of the Tongue; also Dentition. Remove teeth from the cadaver for study of their different characteristics. Sketch.
- ☐ 14. In the cut section of the Larynx, identify:
 

Epiglottic Cartilage	Laryngeal Ventricle
Thyroid Cartilage	Plica Ventricularis
Cricoid Cartilage	Plica Vocalis
Arytenoid Cartilage	Hyothyroid Membrane
- ☐ 15. Locate the Superior Laryngeal Nerve where it leaves the Vagus, and trace to its division into External and Internal Laryngeal branches.
- ☐ 16. Follow the course of the External Laryngeal Branch which innervates the Cricothyroid muscle and part of the Inferior Constrictor. The action of the Cricothyroid muscle is.....



- ☐ 17. Trace the **Internal Laryngeal Branch** (mainly sensory), accompanied by the **Superior Laryngeal Artery**, through the **Hyothyroid Membrane** to the inner surface of the **Larynx**.
- ☐ 18. Locate in the lower part of the neck the **Recurrent Nerve** (**Inferior Laryngeal**), and trace upward to its entrance into the **Larynx** with the **Inferior Laryngeal Artery**, between the lower border of the **Thyroid Cartilage** and the **Cricoid**.

What muscles does this Nerve innervate? .....

.....

- ☐ 19. Identify the origin of the **Inferior Laryngeal Artery**.
- ☐ 20. Draw a small cross section to show the relations of the **Recurrent Nerve** to adjacent structures.

Review the entire structure and musculature of the **Larynx**.

Draw a sketch of the **Tongue** showing the distribution of all its nerves. Indicate the function of each.





## CERVICAL STRUCTURES (COMPLETED)

A. TOPIC FOR DISCUSSION. Lymphatic Drainage of Head and Neck.

B. SPECIAL STUDY

*Nerves:*

Systema nervorum sympathicum (Pars cervicalis)

Truncus sympathici

Ganglia Cervicalia; superius, medius, inferius

Nn. Cardiaci; superior, medius, inferior

Vagus (X)

Phrenicus

*Arteries:*

Thyroidea superior

Thyroidea inferior

(Thyroidea ima)

Vertebralis

*Veins of the Neck:*

Glandulae thyreoideae

Glandulae parathyreoideae

Lymphoglandulae

Oesophagus

Trachea

C. DIRECTIONS FOR DISSECTION AND STUDY

- ☐ 1. Review the position of the Thyroid Gland and of its Isthmus, to the Larynx and Trachea. Note presence of a Pyramidal Lobe and with what part it may be connected.

*Note:* The emergency operation of Tracheotomy (for respiratory obstruction) is commonly performed between the Isthmus and Cricoid cartilage with a vertical midline incision to avoid cutting the Anterior Jugular Veins.

- ☐ 2. Identify the course and drainage of the Thyroid Veins.

Superior Thyroid into.....

Middle Thyroid into.....

Inferior Thyroid into.....

- ☐ 3. Trace the Superior Thyroid Artery and its Superior Laryngeal branch.
- ☐ 4. Trace the Inferior Thyroid Artery from the Thyrocervical Trunk, identifying its branches.
- |                    |                                      |
|--------------------|--------------------------------------|
| Inferior Laryngeal | Muscular (to deep muscles)           |
| Tracheal rami      | Ascending Cervical (anastomoses with |
| Oesophageal rami   | deep cervical arteries)              |
- ☐ 5. Identify presence of a Thyroid Ima Artery and note its point of origin.
- .....
- ☐ 6. Remove the capsule from the posterior surface of the Thyroid Gland and identify the small Parathyroids. Note their size, position and number.
- .....
- .....
- .....
- ☐ 7. Identify at what vertebral level the Cricoid Cartilage and beginning of the Oesophagus are located.
- .....
- ☐ 8. Study the thickness of the Oesophageal wall, identifying its four layers fibrous, muscular, areolar, and mucous.
- Note its Arterial Supply.....
- .....
- Nerve Supply.....
- .....
- ☐ 9. Study the structure of the Trachea, noting the extent of its cartilaginous rings, and its layers.
- Blood Supply.....
- Nerve Supply.....
- ☐ 10. Review the relationships of the following structures as they are revealed in cross sections of the upper and lower levels of the neck:
- |                       |                   |
|-----------------------|-------------------|
| Oesophagus            | Ansa Hypoglossi   |
| Trachea               | Vagus Nerve       |
| Carotid Arteries      | Sympathetic Trunk |
| Internal Jugular Vein | Recurrent Nerve   |
| Phrenic Nerve         | Accessory Nerve   |

- ☐ 11. Study and draw a sketch of the Cervical Portion of the Sympathetic System and the contributions of the three Cervical Ganglia to:
  - a. Cervical and Brachial Plexuses
  - b. Pharyngeal Plexus
  - c. Carotid Arteries
  - d. Cardiac Plexus
- ☐ 12. Try to identify the Superior, Middle and Inferior Cardiac Nerves, originating from the corresponding Ganglion, and trace downward. Include these in sketch.
- ☐ 13. Review and remove the deep muscles of the neck and base of the skull.
- ☐ 14. Disarticulate the First Cervical Vertebra (Atlas) to study its articular surfaces and ligaments, and its relation to the Dens of the Second Vertebra.
- ☐ 15. Remove the Second and Third Cervical Vertebrae separately for similar study and comparison.
- ☐ 16. Identify the course of the Vertebral Arteries within the foramina of the transverse processes of the Cervical Vertebrae.
- ☐ 17. Identify the Dome of the Pleura emerging slightly above the upper level of the First Rib.
 

Try to identify Sibson's Fascia, a thin aponeurotic sheet attached to the upper border of the First Rib, and posteriorly to the Transverse Process of the Seventh Cervical Vertebra. It often contains sparse muscle fibers (M. Scalenus Minimus) and is so intimately united with the Pleural Dome as to make separation difficult.
- ☐ 18. Read up Lymphatic Drainage of the Head and Neck, and locate on a sketch the general distribution of nodes and routes of drainage as indicated below.

#### **Lymph Nodes of the Face and Head**

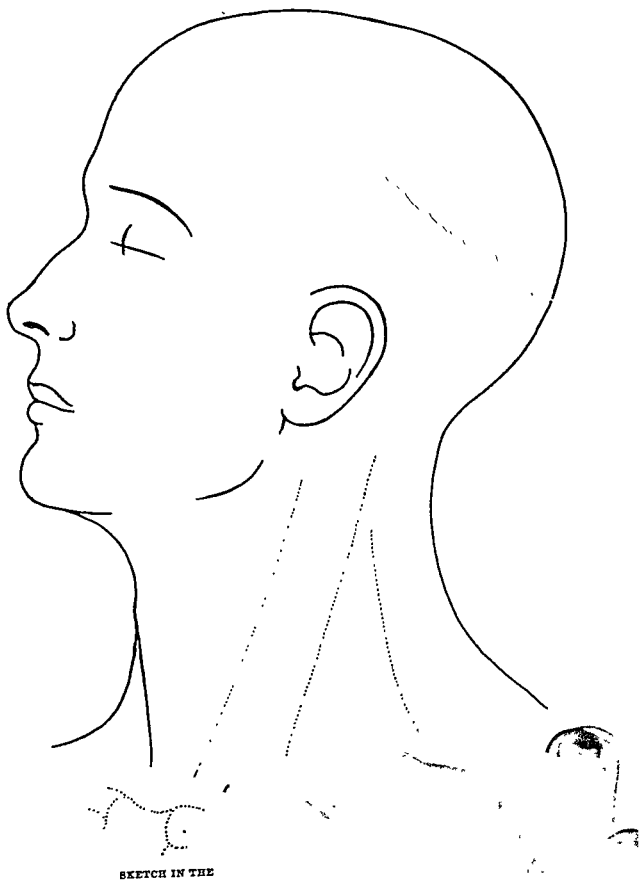
*Facial Nodes* drain eyelids, nose, cheek, to Submaxillary, to Superior Deep Cervicals.

*Deep Facial Nodes* drain Temporal region and Nasopharynx, to Superior Deep Cervicals.

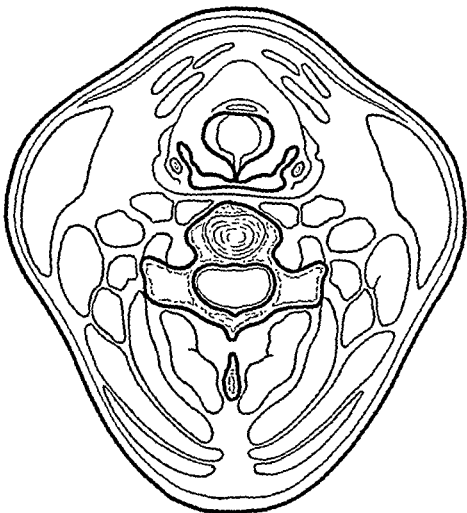
*Parotid Nodes* drain Fronto-temporal and ear regions, and more deeply, Nasopharynx, to Superior Deep Cervicals.

*Auricular Nodes* drain Ear and Temporo-parietal regions, to Superior Deep Cervicals.

*Occipital Nodes* drain Occipital region, to Superior Deep Cervicals.







CROSS SECTION OF THE NECK BETWEEN 4TH AND 5TH CERVICAL VERTEBRAE

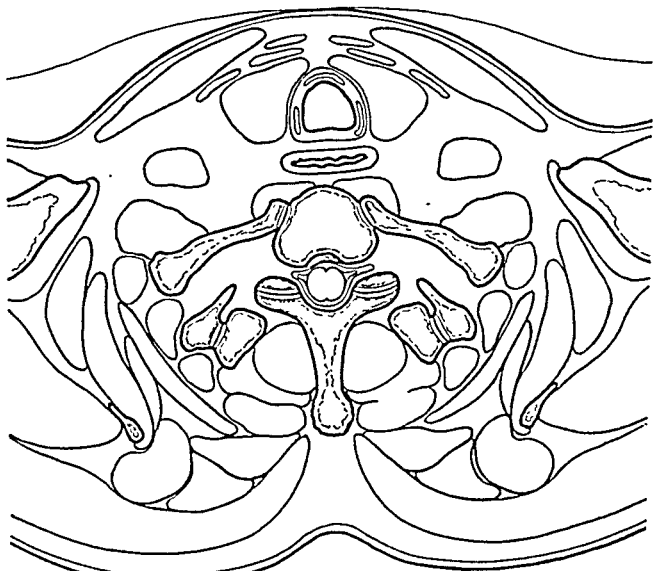
Locate the following—

Platysma	Longus Capitis	Semispinalis Capitis
Sternohyoid	Scalenus Anterior	Multifidus
Omoxyoid	Scalenus Medius	Pharynx
Sternothyroid	Levator Scapulae	Larynx
Pharyngeal Constrictor	Longissimus Capitis	Epiglottic Cartilage
Sternocleidomastoid	Trapezius	Thyroid Cartilage (superior horn)
Longus Colli (2 parts)	Splenius Capitis	

Sketch in the distribution of Cervical Fascia labeling its various parts.

Locate and identify by number the following—

Arteries	Veins	Nerves
Common Carotid	Anterior Jugular	Hypoglossal
Superior Thyroid	External Jugular	Vagus
Vertebral	Internal Jugular	Cervical Roots
Deep Cervical	Vertebral	Superior Laryngeal
	Deep Cervical	Great Auricular
		Accessory
		Sympathetic Trunk



CROSS SECTION THROUGH BASE OF THE NECK AT LEVEL OF 1ST THORACIC VERTEBRA

Identify the following—

Sternocleidomastoid

Sternohyoid

Sternothyroid

Omothyoid

Deltoid (small portion)

Trapezius (clavicular)

Trapezius (scapular)

Suprascapular

Subscapular

Serratus Anterior (3 digitations)

Levator Scapulae

Serratus Posterior Superior

Rhomboid Minor

Rhomboid Major

Splenius

Semispinalis

Multifidus

Longissimus

Iliocostalis

Scalenus Posterior

Scalenus Medius

Scalenus Anterior

Longus Colli

Thyroid Glands

Trachea

Oesophagus

First Rib

Articulations

Costocentral 1

Costotransverse 2

Intervertebral T1-2

Locate and label the following by number—

Arteries

Common Carotid

Inferior Thyroid

Vertebral

Deep Cervical

Transverse Cervical

Veins

Anterior Jugular

Internal Jugular

External Jugular

Vertebral

Deep Cervical

Transverse Cervical

Nerves

Recurrent Phrenic

Vagus Sympathetic

Brachial Plexus segments

Root T1 Posterior Cord

Lower Trunk Lateral Cord





X X X V I  
THORACIC WALL AND PLEURA

A. TOPIC FOR DISCUSSION. Surface Topography.

B. SPECIAL STUDY

*Nerves:* Intercostales

*Arteries:*

Mammalaris Interna

Intercostales

*Veins:*

Mammalaris Interna

Intercostales

C. DIRECTIONS FOR DISSECTION AND STUDY

- ☐ 1. Review on the chest wall the position of the following:

Angulus Sternalis (level of second Intercostal Space)

Intercostal Spaces (note the level of each in relation to chest wall)

Location of Nipple

Distance of Costocartilaginous joints to the midline of body.

Lower margin of Pectoralis Major

- ☐ 2. Determine the position of the underlying structures to the anterior chest wall.

Border of Pleura (note difference of antero-medial borders on the right and left sides, Pericardium)

Borders of Lungs, also Fissures and Lobes

Outline of Heart

Arch of Aorta

Bifurcation of Trachea

Dome of Liver

- ☐ 3. Reflect the skin downward to the level of the lowest rib (Infracostal Line). Remove the Pectoral muscles.

- ☐ 4. On the lateral wall of the Thorax, dissect up two or three External Intercostal muscles. Then reset part of one rib to identify the Intercostal Nerves and Vessels. Note their relative positions; vein superiorly, artery, then nerve.

- ☐ 5. In the fourth and fifth Intercostal spaces trace them medially to observe their dipping beneath the Internal Intercostal muscle to lie between the latter and the Transverse Thoracic muscle.

- ☐ 6. Follow the anterior rami of the Lateral Cutaneous division of the sixth and seventh Intercostal Nerves upon the anterior wall of the Abdomen in the Epigastric region. Also identify the Anterior Cutaneous branches nearer the midline.
- ☐ 7. a. Starting at the point where the Subclavian vessels cross the first rib, cut the first four ribs in a diagonal direction to the Midaxillary Line; then follow this line until the ninth rib is cut. Divide the Internal Mammary Arteries near their origin.  
b. By carefully separating the Pleura from the chest wall with your fingers, reflect the entire flap downward with as little injury to underlying structures as possible.
- ☐ 8. In the cervical region, identify Sibson's Fascia with which the Cupula of the Pleura is fused, reinforcing the separation of the Pleural cavity from the interfascial planes of the Cervical region. Also locate the Anterior Pericardial Ligaments in the sternal region.
- ☐ 9. Identify the course of the Internal Mammary Arteries and Veins on the inner surface of the thoracic flap, and in relation to the Transversus Thoracic muscle. Expose their anastomoses with the Intercostal vessels.
- ☐ 10. Identify the terminal branches of the Internal Mammary Artery:
  - a. Musculophrenic, following the lower cartilage.
  - b. Superior Epigastric (origin), continued into Abdominal Wall. (It anastomoses with the Inferior Epigastric of the External Iliac Artery.)Note its small visceral (mediastinal and pericardial) and sternal rami.

*Note:* The Pericardiophrenic Artery is given off near the neck and accompanies the Phrenic Nerve on each side of the Pericardium.

Review the Pleura and its reflections, also the divisions, boundaries and contents of the Mediastinum; namely, Superior, Anterior, Middle and Posterior.

Review completely the blood and nerve supply of the Breast; also its lymphatic drainage. (Page 321.)

Review the Sternum and Ribs.

X X X V I I  
L U N G S   A N D   H E A R T

A. TOPICS FOR DISCUSSION. Respiration. Clinical Considerations.

B. SPECIAL STUDY

Pulmo

Radix pulmonis

Pericardium

Epicardium

Cor

Plexus Cardiacus

C. DIRECTIONS FOR DISSECTION AND STUDY

- ☐ 1. Remove Residual Thymic fat and cut the Pleura of each side along the exact line of its medial reflection. Note the extent to which the Pleura covers the Pericardium.
- ☐ 2. Expose the anterior surface of the Lungs and study them in position; their fissures and lobes. The Intercostal muscles may be cut from the sternal flap for topographic study of the Lungs and Heart, when the flap is returned to position.
- ☐ 3. Pull the Lungs laterally to locate their Roots. Trace the Mediastinal Pleura noting that it continues dorsally above and below the Roots, but on the latter it is reflected toward the Lung to be continued on its external surface as the Pulmonary or Visceral Pleura. Identify the Pulmonary Ligament of each side.
- ☐ 4. Remove the anterior portion of the Lungs by cutting each Lung on a plane between the line of cut ribs and the anterior surface of its Root. Retain for study.
- ☐ 5. The Heart, its Pericardium, and proximal parts of the large vessels are seen to occupy the Middle Mediastinum. The vessels extend into the Superior Mediastinum, the lower level of which should now be determined.
- ☐ 6. Review the structure and distribution of the Pericardium.
- ☐ 7. Locate the Phrenic Nerves at their entrance into the Thorax. Follow them downward on the Pericardium accompanied by the Pericardiophrenic Arteries, but do not lift them from position.
- ☐ 8. With scissors cut the Pericardium in midline from the Diaphragm upward to where it fuses with the surface of the Aortic Arch. Separate the edges and identify the structures listed below and their position to the midsternal line:

Aorta

Pulmonary Artery

Conus Arteriosus

Right Auricle

Right Atrium

Right Ventricle

Coronary Sulcus

- ☐ 9. Along the diaphragmatic border cut the Pericardium from midline toward each side, as far as the Phrenic Nerve; then carry the cut upward, beside the Nerve, to the great vessels. Continue the cut along the attachment of the Pericardium to the Aorta and Superior Vena Cava on the right side, and to the Aorta and Pulmonary Artery on the left side.
- ☐ 10. After removing the anterior portion of the Pericardium, review the entire anterior surface of the Heart, noting the shape, size, position and topography (without and with the sternal flap in place).
- ☐ 11. Study the extent of the Pericardial Cavity as exposed; also the Epicardium.
- ☐ 12. Locate the Transverse Sinus running crosswise between the Pulmonary Arteries and Veins by inserting the index finger between the Superior Vena Cava and the Aorta. Also, by inserting your finger beneath the Heart, identify the Oblique Sinus as a pocket between the Inferior Vena Cava and Pulmonary Veins.
- ☐ 13. Locate and trace the anterior course of the Right Coronary Artery and Small Cardiac Vein in the Coronary Sulcus; follow their continuation as the Right Marginal Artery and Vein along the border of the Right Ventricle.  
  
*Note:* During this dissection, identify nerves from the Anterior Coronary Plexus which supply the Right Atrium and Ventricle.
- ☐ 14. Locate the Anterior Descending branch of the Left Coronary Artery and trace it, accompanied by the Great Cardiac Vein, along the Anterior Longitudinal Sulcus. Identify the Left Marginal Vein, a branch of the Great Cardiac Vein. Identify nerves from the Posterior Coronary Plexus which supply the Left Atrium and Ventricle.

Review the work of the first dissection on the Lungs, Trachea and Bronchi. (Do not remove the Lungs yet.)

Read up and briefly describe the Cardiac Plexus, its source and parts.

X X X V I I I  
H E A R T ( C O M P L E T E D )

A. TOPICS FOR DISCUSSION. Foetal and Postnatal Circulation. Clinical Considerations.

B. SPECIAL STUDY

Cor

Atrium dextrum

Ventriculus dexter

Atrium sinistrum

Ventriculus sinister

Valvulae

C. DIRECTIONS FOR DISSECTION AND STUDY

- ☐ 1. Determine a plane about three-quarters of an inch posterior to the ventral surface of the Heart. Along this plane, cut away the anterior wall to expose the interior of the Heart and of the proximal (intra-pericardial) portion of the Pulmonary Artery. Save the anterior wall of the Heart for later study. (The left Auricle is not reached with this exposure.)
- ☐ 2. Remove all clotted blood and injection mass from the opened chambers of the Heart, and slit the anterior surface (intrapericardial portion) of the Aorta to follow its lumen into the Left Ventricle.
- ☐ 3. Review the topography of the interior of the Heart while in position.
- ☐ 4. Study the relations of the Chambers and Valves of the Heart to the chest wall by replacing the Sternal Flap.
- ☐ 5. Cut the Aorta and Pulmonary Artery *within* the Pericardium. Similarly, cutting close to the Heart wall, divide the Inferior and Superior Venae Cavae, the Left and Right Pulmonary Veins, and remove the Heart.
- ☐ 6. Identify on the posterior wall of the Pericardium:
  - Transverse Sinus*, running crosswise between the Pulmonary Arteries and Veins.
  - Oblique Sinus*, a horseshoe-shaped area located between the Pulmonary Veins and the Ascending Vena Cava.
- ☐ 7. Identify in the Pericardial Cavity the number of openings of the Pulmonary Veins. Each lobe of the Lungs has one vein, but the one from the Middle Right Lobe usually empties into the vein from the Upper Lobe before entering the Pericardium.

## HEART (COMPLETED)

- ☐ 8. On the Heart, complete the dissection of the Coronary Arteries to their origin from the Aorta; also the Coronary Sinus and its tributaries, identifying its orifice into the Right Atrium and its valve (Thebesius). Observe the nerves from the Cardiac Plexus while doing so.
  - ☐ 9. Review the Heart in its entirety according to notes of the First Dissection.
- FOETAL CIRCULATION. (Make a sketch to supplement description.)

xxxix  
MEDIASTINAL STRUCTURES

A. TOPICS FOR DISCUSSION. Topographic Relationships. Cardiac and Pulmonary Plexuses.

B. SPECIAL STUDY

*Nerves:*

Vagus (X)

Recurrens

Cardiac

Plexus cardiacus

Plexus pulmonalis anterior

*Arteries:* Aorta and branches

*Veins:* Vena Cava Superior and branches

Radix pulmonalis

C. DIRECTIONS FOR DISSECTION AND STUDY

- ☐ 1. Cut the Pericardium with scissors, immediately posterior to the Phrenic Nerve on each side, from the Diaphragm to the point where the Nerve joins with the Pericardium. Note the destination of this nerve.
- ☐ 2. Dissect away carefully the entire posterior portion of the Pericardium to uncover all the subjacent structures.
- ☐ 3. In the tissue on the anterior surface of the root of the Lung and over the Bronchi, try to identify the nerve fibers of the small Anterior Pulmonary Plexus (right and left portions), formed chiefly from the Vagi. Fibers are received from the Sympathetic, Deep Cardiac and Posterior Pulmonary Plexuses. (Left side, also fibers from Superficial Cardiac Plexus.)
- ☐ 4. Identify the presence of Tracheobronchial Lymph Nodes in the area of the bifurcation of the Trachea; also the Bronchial Arteries from the Thoracic Aorta.
- ☐ 5. Review the structures contained in the roots of the Lungs; identify and sketch their exact relationships.
- ☐ 6. Dissect away Lung tissue near the roots sufficiently to follow the Pulmonary Arteries and Veins, also the Bronchi and Bronchial Arteries for an inch or two into the Lungs.  
Identify the Eparterial Branch of the Right Bronchus.





- ☐ 7. Lift the apex of each Lung and cut through the structures of each root. Be careful on the right side not to injure the Azygos Vein emptying into the Superior Vena Cava posteriorly. On the left side, look out for the Highest Intercostal Vein, emptying into the Left Innominate. Lift out the Lungs.
- ☐ 8. Carefully strip the Mediastinal Pleura by blunt dissection, or with fingers, as far as the angle of the ribs.
- ☐ 9. Clear connective tissue from the Superior Vena Cava and the Right and Left Innominate Veins, identifying their branches.

*Superior Vena Cava*    *Azygos*

<i>Innominate Veins</i>	Internal Mammary (Right and Left)
	Inferior Thyroid (Right and Left)
	Highest Intercostal (Left)
	(on the right side, into Azygos Vein)
	Subclavian (Right and Left)

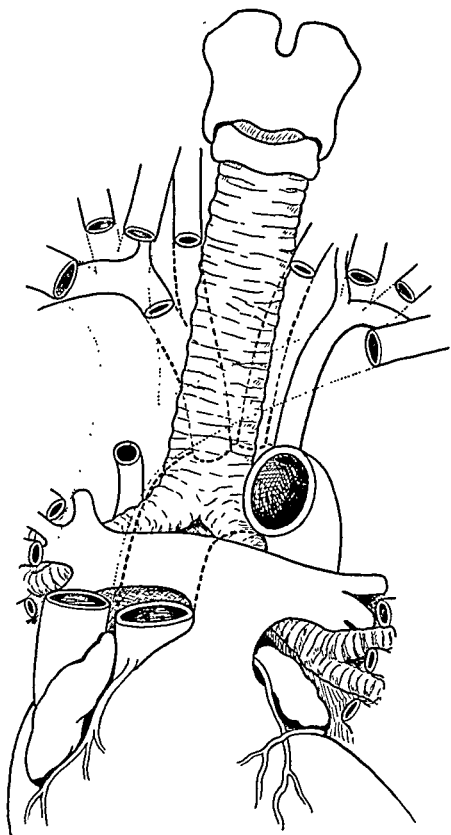
- ☐ 10. Study the topography of the branches of the Aortic Arch:
  - a. Innominate, Right Common Carotid, and Right Subclavian
  - b. Left Common Carotid
  - c. Left Subclavian

Observe whether a Thyroid Ima Artery is given off from the Innominate.
- ☐ 11. Note the relation of the Phrenic Nerves to the Subclavian Arteries and Veins.
- ☐ 12. Cut the Left Innominate Vein at its Caval union and reflect to expose the region above the Aortic Arch. Also divide the Innominate Artery about a half inch from its origin on the Arch of the Aorta.
- ☐ 13. Identify the location of the Superficial and Deep Portions of the Cardiac Plexus; also, the location of the Pulmonary Plexus, (Anterior and Posterior) on the Bronchi.
- ☐ 14. Pick up the Right Vagus Nerve in the Neck and trace it downward to identify the origin of the Right Recurrent Nerve; trace the latter's upward looping under the Right Subclavian Artery.
- ☐ 15. Note the relation of the Right Vagus Nerve to the arteries, Subclavian, Innominate and Aorta; to the Veins, Innominate and Superior Vena Cava; and to the Trachea.

.....

.....

.....



IDENTIFY THE BLOODVESSELS AND DRAW IN THE NERVES OF THIS REGION

- ☐ 16. Follow the **Left Vagus Nerve**, identifying the origin and trace the looping of the **Left Recurrent Nerve** under the Arch of the Aorta and upward in the neck.
- ☐ 17. Note the relations of the **Left Vagus Nerve** to the **Left Common Carotid Artery** and **Aortic Arch**, and to the **Left Innominate Vein**.
- .....
- .....
- ☐ 18. Try to identify the branches of the **Vagi** communicating with the **Cardiac Plexus**.
- ☐ 19. Locate fibers of the **Superficial Cardiac Plexus** lying on the Arch of the Aorta, and the small **Cardiac Ganglion** of Wrisberg, if present, on the right side of the **Ligamentum Arteriosum**.
- ☐ 20. Posteriorly to the Arch, locate the **Deep Cardiac Plexus**, lying in front of the bifurcation of the Trachea.
- ☐ 21. Try to trace the three **Cardiac Nerves** of each side from their **Cervical Ganglia** to the **Cardiac Plexus**.
- With what nerves do the **Cardiac Nerves** communicate?
- Superior.....
- .....
- Middle.....
- .....
- Inferior.....
- .....
- ☐ 22. Try to identify fibers connecting the **Deep Cardiac Plexus** with the **Anterior Pulmonary Plexus** in front of the roots of the Lungs; and on the left side, the fibers between the **Superficial Cardiac Plexus** and the **Anterior Pulmonary Plexus**. Also try to identify fibers going to the **Anterior** and **Posterior Coronary Plexuses**.

Describe and sketch diagrammatically the **Cardiac Plexus**, and the **Anterior** and **Posterior Coronary Plexuses**.



# MEDIASTINAL STRUCTURES (COMPLETED)

## A. TOPIC FOR DISCUSSION. Lymphatic Drainage of the Thorax.

## B. SPECIAL STUDY

### *Nerves:*

Vagus (X)

Plexus pulmonalis posterior

Plexus oesophageus

Phrenicus

Truncus sympatheticus

Ganglia thoracalia

Splanchnicus major

Splanchnicus minor

*Arteries:* Aorta thoracica and branches

### *Veins:*

Vena cava superior and branches

Azygos

Hemiazygos

Hemiazygos accessoria

Trachea

Oesophagus

Ductus thoracicus

## C. DIRECTIONS FOR DISSECTION AND STUDY

- ☐ 1. Clean connective and areolar tissue from the Trachea and large vessels, and carefully reflect the Trachea upward. Identify the right and left portions of the Posterior Pulmonary Plexus, noting their formation from the two Vagi.
- ☐ 2. Below the level of the Tracheal bifurcation, identify on the surface of the Oesophagus the network of branches continued from the Vagi, to form the Oesophageal Plexus. Observe that near the Diaphragm this network converges again into one or two Vagus trunks on each side, the left ones swinging anteriorly on the Oesophagus.
- ☐ 3. Remove the Parietal Pleura from the posterior Thoracic wall, and locate the Intercostal vessels as they pass from under the medial border of the Internal Intercostal muscles. Follow them medially noting their relation to the Sympathetic Trunk.



# MEDIASTINAL STRUCTURES (COMPLETED) 451

## LEFT SIDE

- ☐ 11. Trace the lower Intercostal Veins (eighth to eleventh) to the Hemiazygos Vein, and follow the latter by displacing the Aorta medially, to its deflection toward the right side (ninth Thoracic vertebra) to empty into the Azygos Vein. Observe its course beneath the Thoracic Duct, and its position to the root of the Lungs.

List all the tributaries of the Hemiazygos Vein:

.....

.....

- ☐ 12. Follow the middle Intercostal Veins (fourth to eighth) to their union with the Accessory Hemiazygos Vein. Trace to identify its drainage point (about eighth thoracic vertebra) into the Azygos or Hemiazygos Vein.

List all its tributaries:

.....

.....

.....

- ☐ 13. Note that the second and third Intercostal Veins, sometimes the fourth, join to form the Left Superior Intercostal Vein as on the right side, but it drains into the Left Innominate Vein.

The tributaries of the Left Superior Intercostal Vein are:

.....

.....

*Note: Anastomoses involving the foregoing veins, are important clinically in cases of obstruction of the Vena Cava.*

- ☐ 14. Follow the course of the Aorta, its arch and descending portion and identify the origin of all arteries originating from it. Draw a sketch labeling the branches. Study its relations.
- ☐ 15. Identify all structures which pass through the Diaphragm to or from the Abdominal Cavity.

Review the Trachea and Oesophagus.



452 MEDIASTINAL STRUCTURES (COMPLETED)

Describe and sketch the Pulmonary and Oesophageal Plexuses.

Lymphatics of the Thorax.

1

2

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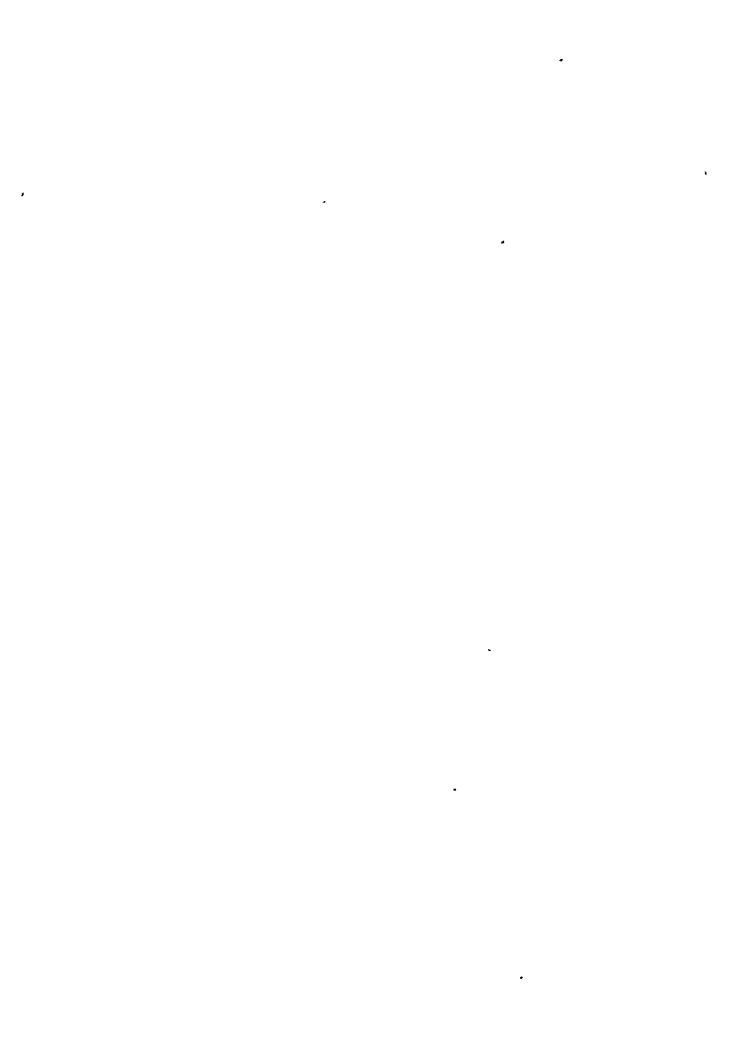
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# ABDOMINAL WALL AND INGUINAL CANAL

XLI

A. TOPICS FOR DISCUSSION. Surface Topography. Herniae. Principles of Surgical Incisions of the Abdominal Wall.

## B. SPECIAL STUDY

Topographical Divisions of the Abdomen  
Visceral relations  
Muscles and Fascial Planes  
Canalis Inguinalis

## C. TOPOGRAPHIC STUDY

- ☐ 1. Replace the Anterior Thoracic wall and skin of the Epigastric region and fasten them in position.
- ☐ 2. Divide the Abdomen into its nine topographic regions by drawing on the skin the following lines:

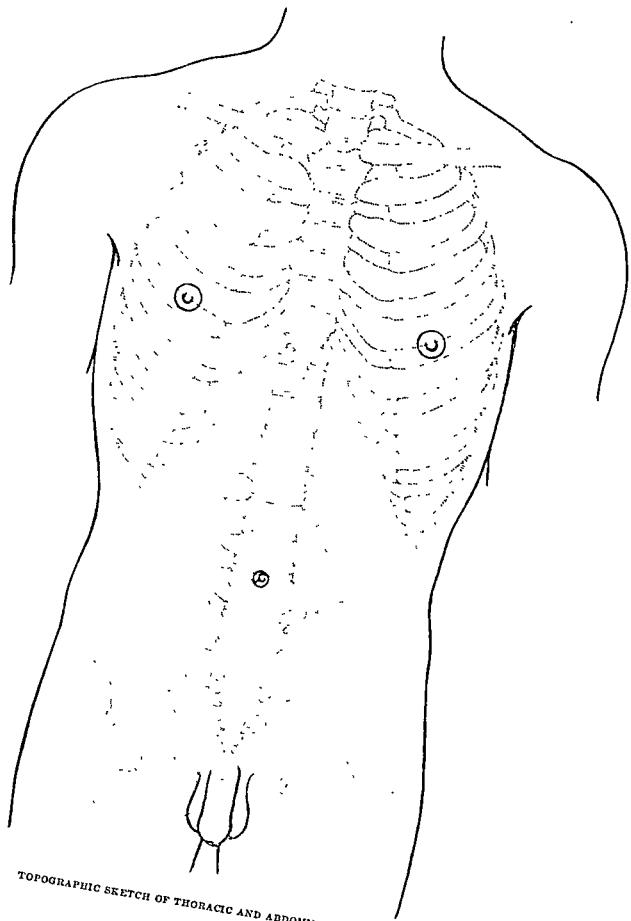
*Infracostal*: between lowest points of the tenth Costal borders  
*Intertubercular*: between the points of each Iliac Crest where it is crossed by the Midaxillary line  
*Parasagittal*: parallel lines through the midpoint of each Inguinal Ligament

Identify the regions marked out, by their names.  
Epigastric, Right and Left Hypochondriac  
Umbilical, Right and Left Lumbar  
Hypogastric, Right and Left Iliac

- ☐ 3. Mark on the skin of the abdomen the projected levels of the Vertebral segments, estimating their position by the Xiphoid Process being located opposite the tenth Dorsal, and the Intertubercular Line passing across the body of the fifth Lumbar vertebra.  
At what level is the Umbilicus? .....

The Infracostal Line? .....

- ☐ 4. Locate the position of, and draw, the Transpyloric Line, at midpoint between the top of the Sternum and Pubis.  
What is its Vertebral Level? .....



TOPOGRAPHIC SKETCH OF THORACIC AND ABDOMINAL VISCERA

- ☐ 5. Project and outline upon the skin, the position of the following viscera in their proper relations to the nine topographic regions:

Kidneys	Liver (lower border)
Suprarenals	Gall bladder
Ureters	Pylorus and Duodenum
Pancreas	Gall ducts
Spleen	Aortic bifurcation
Appendix (base)	

Vertebral attachment of the Mesentery

- ☐ 6. Identify and make a list of important blood vessels located in each region, such as might involve serious results from a gunshot or perforating wound in the abdomen.

#### D. DIRECTIONS FOR DISSECTION AND STUDY

- ☐ 7. a. Make a medial skin incision from the sternal flap to the Pubic bone interrupted by a small circular incision about the Umbilicus.  
b. Dissect the skin downward to one inch below the Iliac Crest and Inguinal Ligament.
- ☐ 8. Trace the Thoracoepigastric Vein to its anastomosis with the Superficial Epigastric Vein of the groin, a branch of the Great Saphenous Vein.
- ☐ 9. Identify the distribution of the Intercostal Nerves supplying the skin of the abdomen; pick up between the digitations of the External oblique, and trace the anterior divisions of two Lateral Cutaneous branches, also the Anterior Cutaneous branches emerging along the borders of the Recti muscles. Which Intercostal nerves have distribution upon the Anterior Abdominal Wall?

.....

- ☐ 10. Near the groin locate and identify the course of the Superficial Epigastric, Superficial External Pudendal and Superficial Circumflex Iliac Arteries.
- ☐ 11. Remove the fatty layer (Camper's) of the superficial fascia from the Abdomen exposing below the Umbilicus, the deeper membranous layer (Scarpa's); here the superficial nerves and vessels lie between these layers. Locate the cutaneous end-branches of the Iliohypogastric and Ilioinguinal Nerves and preserve.
- ☐ 12. Pick up Scarpa's Fascia lateral to the midline where it fuses with the Linea Alba and reflect it beyond the Inguinal Ligament. (It fuses with the Fascia Lata not far from the Ligament.)

Scarpa's Fascia is continued downward on the Penis, and Spermatic Cord or Labia Majora, then onto the Perineum as Colles' Fascia. Over the center of the Pubis, a thickening of this layer is called the Suspensory Ligament of the Penis, or Clitoris.

# 458 ABDOMINAL WALL AND INGUINAL CANAL

- ☐ 13. After exposing the External Oblique Abdominal muscle, cut with scissors its aponeurosis from above downward, slightly lateral to the sheath of the Rectus as far as the level of the Anterior Superior Iliac Spine; then cut transversely toward that point. Reflect the muscle laterally, separating its origin from the ribs and Iliac Crest, to expose the Internal Oblique.
  - ☐ 14. Review the Internal Oblique Abdominal muscle; and in a similar manner, divide and reflect it laterally with care not to disturb the course of the Inter-costal nerves and blood vessels lying between it and the subjacent Transverse Abdominal muscle.
  - ☐ 15. Identify portions of the twelfth Thoracic Nerve and of the Iliohypogastric from the Lumbar Plexus, lying parallel to the Iliac crest in the same fascia plane.
  - ☐ 16. Split the entire length of the Rectus Sheath in its midline and reflect the anterior portions to expose the Rectus Abdominis and also the Pyramidalis muscles.
  - ☐ 17. Cut the Rectus in the line of the costal border and turn downward to disclose the Superior Epigastric Artery (from the Internal Mammary) and its downward continuation to anastomose with the Inferior Epigastric Artery (from the External Iliac).  
List the anastomoses of the Superior Epigastric Artery:  
.....  
.....
  - ☐ 18. Cut the Transversus carefully from the costal cartilages and try to expose and trace laterally the Musculophrenic Artery (from the Internal Mammary), along the origin of the Diaphragm without entering the Peritoneum.  
.....  
.....
- ## INGUINAL CANAL
- ☐ 19. Examine the splitting of the Aponeurosis of the External Oblique muscle to form the Crura of the Subcutaneous Inguinal Ring, noting the crossing of Intercostal fibers to reinforce the Aponeurosis lateral to the ring.
  - ☐ 20. Cut toward the pubis the Aponeurosis of the External Oblique close to its fusion with that of the Internal Oblique, and reflect. Identify the Falx of the Conjoined Tendon (Internal Oblique and Transversus) and more superficially, the fibers of the Ligamentum Inguinale Reflexum, on the posterior wall of the Ring. Review the composition of these two structures.
  - ☐ 21. Identify the Cremaster muscle and its fibers extending upon the Spermatic Cord, noting the plane of their origin.

- 22. Cut the lower portion of the Internal Oblique near its origin on the Inguinal Ligament and reflect medially to observe the distal portions of the Iliohypogastric Nerve, the Transversus muscle, Abdominal (Internal) Inguinal Ring, and lateral portion of the Spermatic Cord or Round Ligament.
- 23. Examine the Transversalis Fascia forming the posterior wall of the Inguinal Canal and the Interfoveolar Ligament (Hesselbach's). Separate the Transversalis Fascia from the deeper surface of the Transversus, to identify its continuity as the posterior sheath of the Rectus below the Linea Semicircularis.
- 24. Locate the Inferior Epigastric Artery and Vein behind the Transversalis Fascia of the inner ring and trace to its entrance into the Rectus Sheath. Identify the area between the Inferior Epigastric vessels, the Inguinal Ligament and the lateral border of the Rectus, as Hesselbach's Triangle.
- 25. *Inguinal Herniae*, Oblique and Direct  
*Oblique*: enters Inguinal Canal through the Abdominal Inguinal Ring, *lateral* to the Inferior Epigastric vessels, and follows the canal.  
*Direct*: passes through Hesselbach's Triangle, *medial* to the Inferior Epigastric vessels, and directly through the Subcutaneous Inguinal Ring.

Review the Abdominal Muscles, their blood supply and nerves; also the Inguinal Ligament and associated structures entering into the formation of the Inguinal Canal. Complete sketch of sensory areas and cutaneous nerves of the abdominal wall. (Page 314.)





X L I I  
P E R I T O N E U M

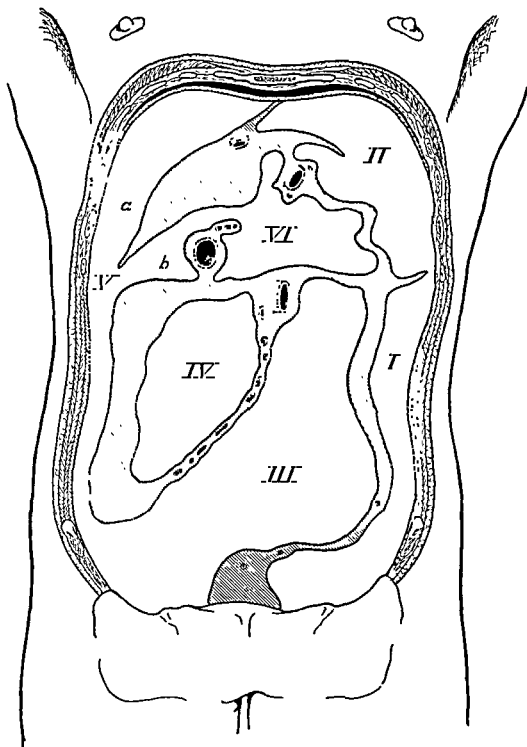
A. TOPICS FOR DISCUSSION. Peritoneum. Epigastric Topography.

B. SPECIAL STUDY

Compartments of the Peritoneal Cavity  
Peritoneal Folds and Ligaments  
Bursa Omentalis  
Epigastric Relationships

C. DIRECTIONS FOR DISSECTION AND STUDY

- ☐ 1. a. Just above the Anterior Superior Spine on each side, make a vertical slit through the Transversus muscle, and the Transversalis Fascia (without entering the Peritoneal Cavity) large enough to admit two fingers.  
b. Using the fingers to push away the underlying Peritoneum, cut with round-pointed scissors the muscle and fascia toward the rib border, then follow the latter to the Xiphoid Process.  
c. Separating the Transversalis Fascia from the Peritoneum, reflect the muscular flaps downward.
- ☐ 2. Identify the Ligament Teres (obliterated Umbilical Vein of the foetus) extending from the Umbilicus to the inferior surface of the Liver and its fold of Peritoneum forming the Falciform Ligament.
- ☐ 3. Cut the Peritoneum along the same line and reflect downward. Examine the character of the Peritoneum.
- ☐ 4. Below the Umbilicus, locate the Urachus and its Peritoneal Fold, the Middle Umbilical Ligament; also the two oblique Lateral Umbilical Folds or Ligaments associated with the obliterated Umbilical (Hypogastric) Arteries.
- ☐ 5. Identify the lower border of the Liver, the course and position of the Stomach, the Lesser and Greater Omentum, the course and location of the various portions of the Colon.
- ☐ 6. With least disturbance to the visceral structures, review the major compartments of the Abdominal Cavity as given in the First Dissection, identifying the structures which separate them.
- ☐ 7. Remove the loosened anterior portion of the chest wall, separating it from the Diaphragm; then cut the Diaphragm on each side sufficiently to reflect it and to trace the Falciform, Coronary and Triangular Ligaments of the Liver and the location of the "Bare Spaces."



POSTERIOR DIVISIONS OF THE ABDOMINAL CAVITY

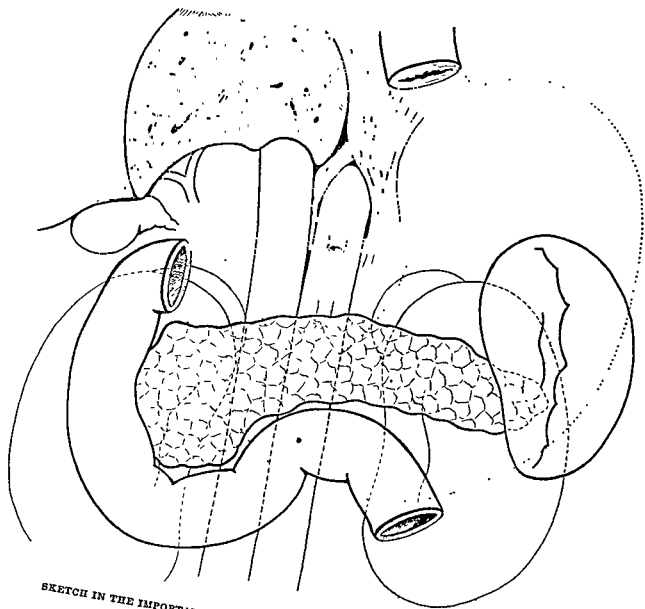
- ☐ 8. Review the general distribution of the Peritoneum as shown in a sagittal section of the Abdomen.
- ☐ 9. Using the accompanying chart showing the posterior attachments of the Peritoneum and Bare Spaces on the posterior abdominal wall, identify on the cadaver as directed below, posterior divisions of the Peritoneal Cavity, and the reflections or ligaments forming them.
- ☐ 10. On the left side locate the Parietal Peritoneum lateral to its reflection from the abdominal wall upon the Descending Colon (I). Trace this section upward to the Phrenicocolic Ligament beneath the Spleen, and downward on the left side of the Sigmoid Mesocolon into the Pelvis (to the left side of the Rectum).
- ☐ 11. Above the Phrenicocolic Ligament and behind the fundus of the Stomach, locate the space (II) which extends superiorly and medially to the Falciform Ligament. It contains the left lobe of the Liver and the Spleen. The medial wall includes the following Ligaments:

Superiorly: Falciform  
                   Left Triangular  
 Posteriorly: Lienorenal  
                   Phrenicolienal  
 Anteriorly: Gastrolienal

- ☐ 12. Between the Descending Colon and the left side of the Mesentery, trace the space (III) upward to the left side of the Transverse Mesocolon; identify the Duodenomesocolic and Duodenojejunal Folds near the union of the Duodenum and Jejunum. Also trace the space downward into the pelvis on the right side of the Sigmoid Mesocolon and Rectum.
- ☐ 13. Between the right side of the Mesentery and the Ascending Colon, trace the space (IV) upward to the right side of the Transverse Mesocolon, and downward to the Iliocaecal union.  
     Locate the Appendix and examine carefully the continuity of Mesentery and Parietal Peritoneum in this region.
- ☐ 14. Laterally, between the Ascending Colon and the abdominal wall, trace the space (V) from the Iliac region upward
  - a. to between the Liver and Diaphragm as far as the Falciform Ligament locating the Right Triangular and Coronary Ligaments.
  - b. transversely between the Liver and the Stomach, identifying the extent of the Lesser Omentum with its two parts, the Hepatogastric and Hepatoduodenal Ligaments.

- ☐ 15. For identification of the remaining space (VI), the Omental Bursa, pull the Liver upward and insert your finger through the Epiploic Foramen located behind the Hepatoduodenal margin of the Lesser Omentum, and above the superior portion of the Duodenum.
- ☐ 16. Study the borders of the Omentum in relation to the Right and Left Flexures of the Transverse Colon. How do the borders terminate on each side?
- Right.....
- Left.....
- ☐ 17. Replace structures and cut the outer layer of the Greater Omentum to trace the anastomosis of the Right and Left Gastroepiploic Arteries, and the accompanying veins. Identify the branches of these vessels supplying the Omentum. Other small branches anastomose with the Middle Colic Artery of the Transverse Mesocolon
- ☐ 18. Trace the Left Gastroepiploic Artery into the Gastrolial Ligament, and the Right Gastroepiploic Artery to its dip beneath the Pylorus.
- ☐ 19. Turn the Omentum upwards to identify its attachment along the anterior taenia of the Transverse Colon between the Hepatic and Splenic Flexures; then cut the two posterior layers where they are attached to the Colon along that line, in order to open widely into the Omental Bursa.
- ☐ 20. Displace the Stomach upward and identify the following structures in relation to the Bursa:
- |                                |                                     |
|--------------------------------|-------------------------------------|
| Epiploic Foramen               | Gastrophrenic Fold                  |
| Vestibuli                      | (containing Left Gastric Artery and |
| Superior Omental Recess        | Coronary Vein)                      |
| Splenic Recess                 | Gastrolial Ligament                 |
| Inferior Omental Recess        | Lienorenal Ligament                 |
| Position of Pancreas           | Phrenicocolial Ligament             |
| Position of Inferior Vena Cava | Hepatoduodenal Ligament             |
|                                | Hepatogastric Ligament              |
- ☐ 21. Remove the greater portion of the left Lobe of the Liver by cutting along the hepatic border of the Left Triangular Ligament above, and of the Hepatogastric Ligament below. (See figure on page 466.)
- ☐ 22. Starting at the fossa for the Ductus Venosus posteriorly, cut the Hepatogastric Ligament of the Lesser Omentum following the lesser curvature of the Stomach, and include the anterior layer of the Hepatoduodenal Ligament.

- ☐ 23. By blunt dissection, with the Liver retracted, work out and identify the structures associated with the Hepatoduodenal Ligament:
- |                       |  |
|-----------------------|--|
| Right Gastric Artery  | Common Bile Duct                             |
| Coronary Vein         | Portal Vein                                  |
| Hepatic Artery        | Nerve strands to Liver, Stomach and Duodenum |
| Gastroduodenal Artery |  |
- ☐ 24. Trace the **Right Gastric Artery** from its origin from the Hepatic Artery to its anastomosis with the **Left Gastric**; carry the blunt dissection further to identify the **Coeliac Axis** and the origin of the **Left Gastric Artery**. Identify the Vertebral level of the **Coeliac Axis**.
- ☐ 25. Review and make a sketch showing the relations of all the structures which lie within the area marked by the Lesser Curvature of the Stomach.



SKETCH IN THE IMPORTANT VESSELS AND NERVES OF THE EPIGASTRIC REGION

# X L I I I E P I G A S T R I C   R E G I O N

A. TOPIC FOR DISCUSSION. Sympathetic Nerve Supply of the Abdomen.

B. SPECIAL STUDY

*Arteries:* Coeliaca and branches

*Veins:* Portae and tributaries

*Nerves:*

Vagus (X)

Truncus Sympathicus

Plexus gastrici

Plexus coeliacus

Phrenicus

Splanchnicus major

Ganglia phrenica

Splanchnicus minor

Ventriculus

Hepar

Vesica fellea

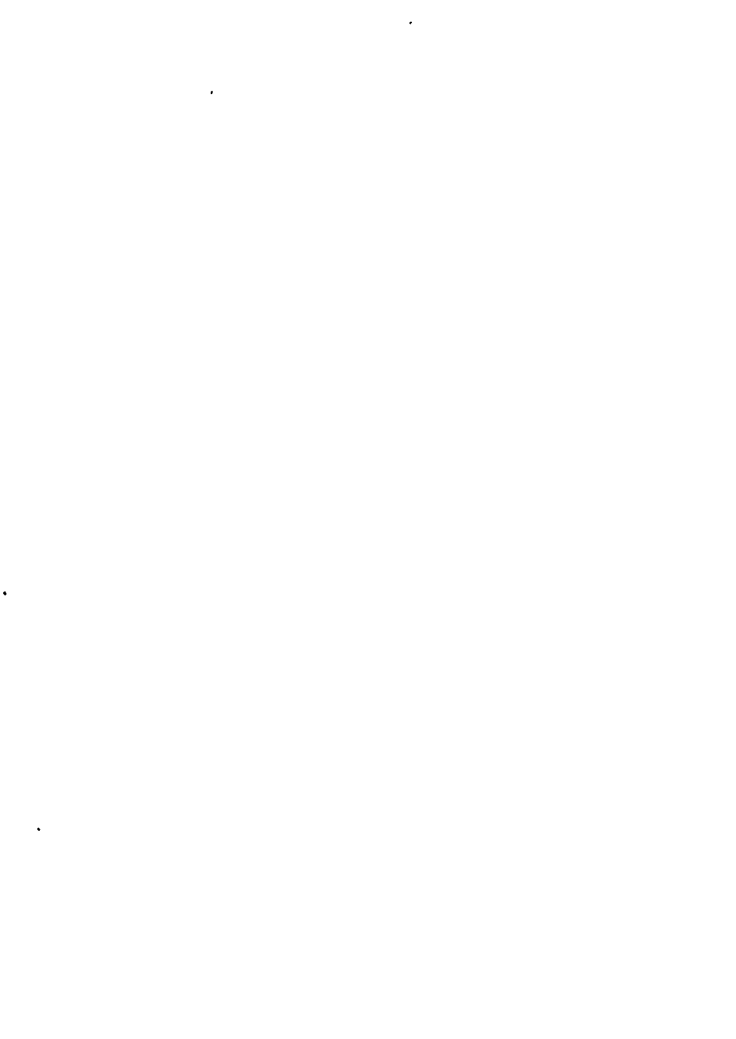
Lien

C. DIRECTIONS FOR DISSECTION AND STUDY

- ☐ 1. Follow the Right Gastroepiploic Artery beneath the Pylorus to its origin from the Gastroduodenal Artery.
- ☐ 2. Double-tie the union of the Pylorus and Duodenum, cutting between the strings; also cut the Right Gastric and Gastroepiploic Arteries and Veins, and the attachment of the Greater Omentum on the right side.  
The latter may be removed entirely, but preserve the Gastroepiploic vessels on the greater curvature of the Stomach if this is done.
- ☐ 3. Reflect the Stomach to the left and retract the Liver. Trace the Hepatic Artery deeply into the Porta Hepatis to identify its right and left branches; also locate the origin of the Cystic Artery and trace it in relation to the Gall Bladder. Look up Calot's Triangle and define.  
  
.....  
.....
- ☐ 4. Expose the origin and proximal course of the Superior Pancreaticoduodenal Artery; try to identify the accompanying Pancreaticoduodenal Vein.

Observe the presence of Sympathetic Nerve fibers and lymph glands as the dissection proceeds.





## REMOVAL OF THE LIVER

- ☐ 5. Detach the Gall Bladder from the Liver and divide the Portal structures deeply in the Porta Hepatis; then cut the Peritoneal attachments of the Liver on both sides; locate the Inferior Vena Cava above the Diaphragm, and inferior to the Liver. Raising the Liver upward to separate the Vena Cava from the fossa on the posterior surface, locate and cut the two Hepatic Veins.
- ☐ 6. Identify and partly isolate in the stump of the Hepatoduodenal Ligament, the Right and Left branches of the Portal Vein and the Bile Duct to note the relative positions of the structures contained in the Ligament.
- ☐ 7. Extend the dissection of the Stomach wall toward the Diaphragm following the Oesophageal Branches of the Left Gastric Artery.
- ☐ 8. Trace the Vagus Nerves which accompany the Oesophagus through the Diaphragm, identifying the destination of the left Vagus as the Anterior Gastric Plexus on the Lesser Curvature of the Stomach. It sends branches upon the anterior wall of that organ.

The right Vagus forms a Posterior Gastric Plexus, also lying near the Lesser Curvature; other branches help to form the Coeliac, Splenic and Renal Plexuses, or go directly to the Liver.

All of these plexuses receive fibers from the Sympathetic System.

- ☐ 9. On the left side of the fundus of the Stomach identify and expose the Short Gastric Arteries from the Lienal Artery, within the Gastrolienal Ligament; also trace the course of the Left Gastroepiploic Artery to its origin from the same source.
- ☐ 10. Trace the Lienal Artery toward the Coeliac Axis (Artery) identifying its branches to the Pancreas and terminal branches to the Spleen, and noting nerve fibers following the artery.
- ☐ 11. Continue cleaning this area to expose the Left Coeliac Ganglion and locate the Greater Splanchnic Nerve as the Coeliac Axis is exposed. The Right Coeliac Ganglion lies behind the Vena Cava, and can best be seen later.
- ☐ 12. Try to identify the smaller Phrenic Ganglion above, which receives terminal fibers of the Phrenic Nerve; also the Aorticorenal Ganglion below, which receives the Lesser Splanchnic Nerve and supplies chiefly the Renal Plexus.
- ☐ 13. Follow the Lienal Vein over the Aorta to empty into the Portal Vein. Trace it in relation to the Lienal Artery and the body and tail of the Pancreas.
- ☐ 14. Identify the Inferior Phrenic Arteries originating from, or immediately above the Coeliac Axis. Observe that the Diaphragm overlies the Aorta, while the corresponding portion of the Inferior Vena Cava is intra-abdominal.

- ☐ 15. Locate by palpation the upper poles of the Kidneys and identify the position of the Suprarenal glands. The anterior surface of the left Kidney and Suprarenal Gland may be partly exposed to facilitate orientation.
- ☐ 16. Retrace all the branches and subbranches of the Coeliac Axis, recording their anastomoses. Draw a diagram of them.

a. Left Gastric

b. Hepatic

*Right Gastric*

*Gastroduodenal*

*Superior Pancreaticoduodenal*

*Right Gastroepiploic*

*Cystic (from Right Hepatic)*

c. Lienal

*Pancreatic rami*

*Short Gastric*

*Left Gastroepiploic*

- ☐ 17. In retracing the veins, observe that they drain into the Portal Vein formed by the union of the Lienal and Superior Mesenteric Veins. Draw a diagrammatic sketch of all the tributaries of the Portal Vein.

The Lienal Vein has the following tributaries:

- a. Short Gastric
- b. Left Gastroepiploic
- c. Pancreatic
- d. Inferior Mesenteric

The Superior Mesenteric Vein drains, in addition to the intestinal and colic tributaries:

- a. Right Gastroepiploic
- b. Pancreaticoduodenal

Other tributaries of the Portal Vein to be reviewed are:

- a. Coronary
- b. Pyloric
- c. Cystic
- d. Parumbilical

Review the Stomach, its peritoneal relations, structure, blood and nerve supply.

Review the Liver, Gall Bladder and Spleen in the same manner; also make a cross-section sketch of the Hepatoduodenal Ligament to show the positions of the structures contained in it.

Read up and briefly describe the Coeliac Plexus and its secondary plexuses. Draw a sketch indicating their positions and connections.



X L I V  
A B D O M I N A L   C I R C U L A T I O N

A. TOPICS FOR DISCUSSION. Digestion. Assimilation. Lymphatics of the Abdomen.

B. SPECIAL STUDY

*Arteries:*

Mesenterica superior and branches

Mesenterica inferior and branches

*Veins:*

Vena Portae and branches

*Nerves:*

Plexus aorticus abdominalis

Plexus mesentericus inferior

*Viscera:*

Intestinum tenue

Intestinum crassum

Lymphoglandulae

C. DIRECTIONS FOR DISSECTION AND STUDY

- ☐ 1. Reflect the Transverse Colon upward and review the peritoneal relations at the union of the Duodenum and Jejunum. Identify the Duodenojejunal and Duodenomesocolic Folds and the Superior and Inferior Duodenal Fossae. Is a Retroduodenal Fossa present?  
Define the Paraduodenal Fossa, stating with what blood vessel it is associated.
- .....
- .....
- ☐ 2. At the Ileocaecal union, locate the Superior Ileocaecal Fold covering the Superior Ileocaecal Fossa; then lifting the Caecum, identify the Caecal Fossa between the Caecal Fold of Peritoneum laterally and the Mesentericoparietal Fold medially; also the Inferior Ileocaecal Fossa between the Mesenteriole of the Appendix and the Inferior Ileocaecal Fold.
- ☐ 3. Reflecting the coils of Small Intestine toward the left, incise only through the peritoneal layer of the right side of the root of the Mesentery, from the upper to the lower end. Dissect away this peritoneal layer of the Mesentery and fat to expose the Superior Mesenteric Artery and Vein. The Vein, continued from the Portal Vein, lies slightly to the right of the Artery.

- ☐ 4. In the Jejunal portion, extend the dissection from the root to follow the blood vessels and nerves from the Superior Mesenteric Plexus toward the Intestine. Observe how the terminal branches encircle the gut. Note the presence and distribution of Lymph Nodes; also variation in the pattern of the arterial arcades.
- ☐ 5. Along the lower portion of the Mesentery which extends toward the Ileum, identify the Ileocolic Artery.
- ☐ 6. Trace the Ileocolic Artery to its bifurcation into superior and inferior branches, and follow the latter to identify its distribution to the Caecum, Appendix (Appendicular Artery in the Mesenteriole), and distal portion of the Ileum where it anastomoses with the Superior Mesenteric branches.

#### REMOVAL OF SMALL INTESTINE

- ☐ 7. a. Double-tie the Small Intestine (a) at its Duodenojejunal juncture, and (b) two inches proximally to the Ileocaecal juncture.  
b. Incise between the upper ties and extend the cut to the root of the Mesentery.  
c. Then cut along the root, dividing the Mesenteric branches near their origins on the left side of the major trunk of the Superior Mesenteric Artery.  
d. Follow the latter as far as its terminal branches to the Ileum, then carry the cut to the intestine, in order to preserve the Ileocolic anastomoses.  
e. Complete the removal of the intestine by cutting parallel with the Ileum to the lower ligatures.
- ☐ 8. Locate the Right Colic Artery and trace its anastomosis to the Ileocolic Artery below, and to the Middle Colic above.
- ☐ 9. Identify the origin of the Middle Colic Artery and trace its branches through the Transverse Mesocolon, and the course of its left continuation along the upper portion of the Descending Colon to anastomose with the Left Colic Artery from the Inferior Mesenteric Artery. Identify its anastomoses with the Gastroepiploic Arteries.
- ☐ 10. Identify the channels of drainage to the Superior Mesenteric Vein from the Small Intestine, Caecum, Ascending and Transverse Colons. Also read up Lymph drainage.
- ☐ 11. Starting in the upper left quadrant, lift the inferior portion of the Duodenum and locate the Inferior Mesenteric Vein emerging from beneath the Pancreas.
- ☐ 12. In the subsequent dissection, observe the dense network of sympathetic nerve strands the Aortic Plexus, lying upon the Aorta, and following the course of the Inferior Mesenteric Artery, as the Inferior Mesenteric Plexus.

- ☐ 13. By blunt dissection, remove the Parietal Peritoneum from the left side of the posterior abdominal wall as far as the Descending Colon laterally, in order to expose the **Inferior Mesenteric Artery** and its branch, the **Left Colic Artery**.
- ☐ 14. Review the anastomosis of the Middle Colic and ascending branch of the Left Colic Arteries; then carry the dissection downward as far as the rim of the pelvis to expose the course of the **Sigmoid** and **Superior Hemorrhoidal Arteries**, also the **Inferior Mesenteric Vein**. Identify the anastomosis of the descending branch of the Left Colic and Sigmoid Arteries.
- ☐ 15. Free the Ascending and Descending Colons from the lateral walls of the abdomen in order to study the course of the vessels more clearly.

Make a sketch of the blood supply, arterial and venous, to the Large Intestine and Appendix.





## ABDOMINAL CIRCULATION (CONTINUED)

## A. TOPICS FOR DISCUSSION. Routes of Collateral Circulation.

## B. SPECIAL STUDY

*Nerves:* to abdominal viscera

*Arteries:*

Pancreaticoduodenalis superior

Pancreaticoduodenalis inferior

*Veins:* (Corresponding)

Duodenum

Lien

Pancreas

Ductus pancreaticus (Wirsungi)

Ductus pancreaticus accessorius (Santorini)

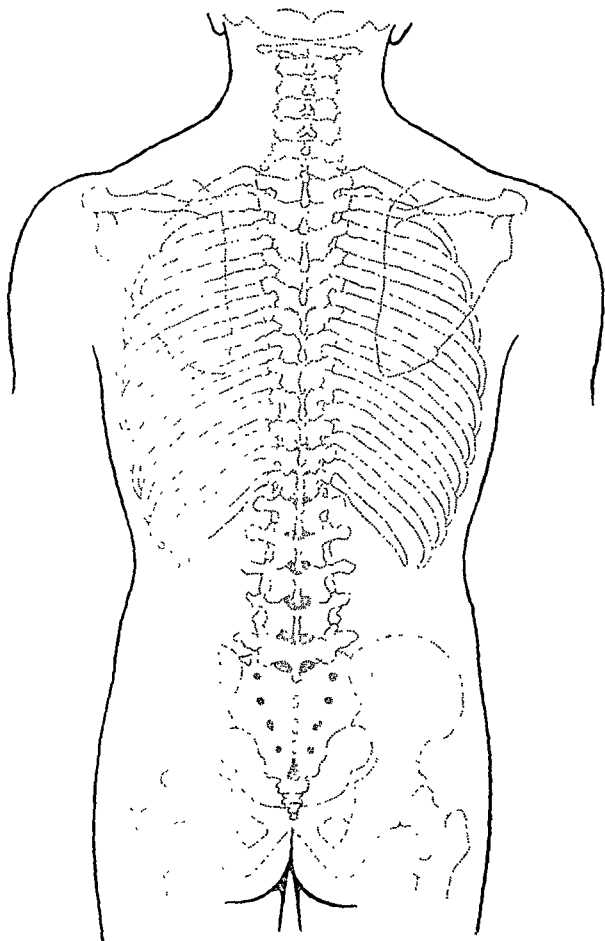
## C. DIRECTIONS FOR DISSECTION AND STUDY

## REMOVAL OF LARGE INTESTINE

- ☐ 1. Double-tie the Large Intestine at the brim of the Pelvis and divide between the ligatures. Preserve the continuity of the Hemorrhoidal portion of the Inferior Mesenteric Artery and Vein by cutting the Sigmoid and Colic branches to the left of the main trunks; leave conspicuous stumps of the Middle Colic in cutting the Transverse Mesocolon, and also of the Superior Mesenteric Artery as the Colon is removed.
- ☐ 2. Review the relations of the Superior and Inferior Mesenteric vessels to the Transverse portion of the Duodenum.
- ☐ 3. Divide the Pancreas through the neck and reflect sufficiently to expose the course of the Liental Vein to the Spleen and its union with the Superior Mesenteric Vein to form the Portal Vein.
- ☐ 4. Locate the Inferior Pancreaticoduodenal Artery originating from the deeper surface of the Superior Mesenteric Artery and trace its course between the head of the Pancreas and the Duodenum to anastomose with the Superior Pancreaticoduodenal Artery from the Gastroduodenal Artery (Hepatic).
- ☐ 5. Expose the union of the Inferior Mesenteric Vein with the Liental Vein, and follow the latter to its union with the Superior Mesenteric Vein.



- ☐ 6. Reflect the Descending portion of the Duodenum toward the left. Trace the Common Bile Duct from the juncture of the Hepatic and Cystic Ducts to where it joins with the Duodenum.
- ☐ 7. Identify the Pancreatic Duct (Wirsungi) and follow it into the substance of the gland. Try to locate the Accessory Duct of Santorini.
- ☐ 8. Locate the Left Renal Vein and note its vertebral level. Identify the positions of the Pancreas, transverse portion of the Duodenum, and origin of the Superior Mesenteric Artery in relation to the vertebral levels.
- ☐ 9. Study the relations of the Pancreas and Duodenum to the underlying right and left Kidneys and Suprarenal glands. Make a sketch showing their position to the vertebral column.
- ☐ 10. The Gall Bladder and Bile ducts, Duodenum, Pancreas, Spleen and Stomach may now be removed for detailed study, leaving the Portal Vein and stumps of all the larger blood vessels.
- ☐ 11. Review the Stomach: Peritoneal relationships, position, structure, blood and nerve supply.
- ☐ 12. Review the Small Intestine (including the Duodenum): Structure and glands, length, blood and nerve supply.
- ☐ 13. Review the Pancreas, including its function, blood and nerve supply.
- ☐ 14. Review the Spleen, its peritoneal relations, function, contact areas, structure, blood and nerve supply. Section it to observe the size and distribution of blood channels, arterial and venous.
- ☐ 15. Read up and briefly describe the Lymphatics of the Alimentary Tract and other abdominal organs.



POSTERIOR TOPOGRAPHIC SKETCH OF THORACIC AND ABDOMINAL VISCERA

X L V I  
RETROPERITONEAL STRUCTURES

A. TOPIC FOR DISCUSSION. Renal Topography.

B. SPECIAL STUDY

*Nerves:*

Sympathici (pars abdominalis)

Plexus coeliacus

Plexus aorticus abdominalis

Plexus hypogastricus

*Arteries:*

Renales and branches

Spermatica interna

Ovarica

Phrenica inferior

Lumbales

*Veins:* (Corresponding)

Ureter

Ren

Glandula suprarenalis

C. DIRECTIONS FOR DISSECTION AND STUDY

- ☐ 1. Locate the Internal Spermatic (male), Ovarian (female) Arteries and Veins and trace them upward through the subserous tissue from the pelvic brim. Observe the accompanying nerve strands, Spermatic or Ovarian Plexus, from the Renal Plexus.
- ☐ 2. Locate the origins of these Arteries on the Aorta in relation to the Renal Veins; also note the point of drainage of the Veins.  
Right Internal Spermatic (Ovarian) Vein into.....  
Left Internal Spermatic (Ovarian) Vein into.. ..
- ☐ 3. Expose and isolate the Ureters, tracing them from the pelvic brim to the capsule of the Kidneys. Observe that they are accompanied by nerve strands from the Spermatic and Inferior Mesenteric Plexuses.
- ☐ 4. Starting from the Renal Veins and working radially, strip away the anterior portion of the Adipose Capsule from each Kidney. As the upper poles are approached, identify the location of the Suprarenal Glands. The right gland may lie well behind the Vena Cava.

- ☐ 5. Continue by blunt dissection to expose on each side the Suprarenal and Inferior Phrenic Veins, and make a note of their points of drainage.
- ☐ 6. Work out the Arteries to the Suprarenal Glands.
  - a. Superior Suprarenal from Inferior Phrenic
  - b. Middle Suprarenal from Aorta
  - c. Inferior Suprarenal from Renal Arteries
- ☐ 7. Compare the relative position of the two Kidneys and report any anomalies in their position.
- ☐ 8. Divide the Left Renal Vein one inch from the Hylum and, reflecting it, cut through the network of Sympathetic nerves (Renal Plexus), to expose the course of the Left Renal Artery to the Aorta. Note the source of the Renal Plexus.  
.....
- ☐ 9. Lift the Vena Cava, separating its upper end from the Diaphragm if necessary, to trace the Right Renal Artery from the Aorta to the right Kidney. Cut the Right Renal Vein one inch from the Kidney to improve observation of the arterial supply.
- ☐ 10. Locate the Right Coeliac Ganglion of the Coeliac Plexus. Review its formation and subordinate plexuses.
- ☐ 11. Study the position of the origins of the Coeliac Axis, Superior Mesenteric, and Renal Arteries to the Aortic Hiatus of the Diaphragm.
- ☐ 12. In exposing the anterior surface of the Aorta, identify the Abdominal Aortic Plexus between the origins of the Superior and Inferior Mesenteric Arteries; also the Hypogastric Plexus below the latter near the bifurcation forming the Common Iliac Arteries.
- ☐ 13. Note the positions of the Common Iliac Arteries and Veins to one another and to the Ureters; also the vertebral level of the origin of the vessels.
- ☐ 14. Strip the Kidneys from their fibrous capsule, noting while doing so, if additional arteries are given off to them by the Aorta. (Report them.)
- ☐ 15. Cut the Renal Arteries but retain the Ureters intact, lifting the Kidneys aside. Remove the Suprarenal Glands for study, reviewing their blood and nerve supply.
- ☐ 16. Strip away the posterior portion of the Adipose Capsule of the Kidneys, then carefully separate the Transversalis Fascia and underlying fatty tissue from the abdominal wall, cutting it with scissors along the border of the Diaphragm.

- ☐ 17. Identify the Psoas, Quadratus and Transversus muscles.
- ☐ 18. Clean and isolate the Inferior Vena Cava, being careful not to injure Sympathetic nerves under its lower portion; reflect it to the side.
- ☐ 19. Locate the Right Sympathetic Trunk and Ganglia, tracing them downward toward the pelvic brim, and identifying their branches to the Aortic and Hypogastric Plexuses. By displacing the Aorta toward the right, locate the corresponding Left Sympathetic Trunk and Ganglia. Lateral branches connect the Sympathetic ganglia with the Lumbar nerves.
- ☐ 20. Separate the Right Crus of the Diaphragm from the Aorta and spread widely to identify the Cisterna Chyli and its exact position on the vertebral column.
- ☐ 21. Follow the course of the Azygos Vein from its origin, along the border of the Crus and through the Aortic Hiatus to its terminus on the Superior Vena Cava in the Thorax. Similarly, trace the Hemiazygos from its origin to its terminus on the Azygos Vein in the Thorax. Review their tributaries.
- ☐ 22. In the fascia covering the Psoas muscle identify and trace the abdominal course of the Genitofemoral Nerve.
- ☐ 23. Similarly, starting from the lateral borders of the Psoas muscles, locate and expose the Iliohypogastric, Ilioinguinal and Lateral Cutaneous Nerves.

Review the Kidney, its relationships, position, blood and nerve supply. Section it longitudinally for study of its structures. Similarly, review the Suprarenal Glands. Review the Diaphragm and structures passing through it.

Read up and briefly describe the Hypogastric Plexus and its pelvic portions.

Draw sketches of the Abdominal Aorta and Inferior Vena Cava, showing the origin of their branches and indicate the vertebral levels.

Review and sketch schematically the entire Sympathetic and Parasympathetic Systems.





# EXTERNAL GENITALIA, MALE AND FEMALE

*Note:* During the subsequent work on the pelvic structures, opportunity should be arranged for students to follow the dissection of both sexes.

## A. TOPIC FOR DISCUSSION. Pelvic Topography.

## B. SPECIAL STUDY

Peritoneum, pars pelvina

*Nerves:*

Genitofemoralis

Ilioinguinalis

*Arteries:*

Spermatica

Pudendae externae

*Veins:*

Spermatica

Pudenda

*Genitalia:*

*Male*

Penis

Scrotum

Testes

Funiculus spermaticus

*Female*

Clitoris

Labia

Vagina

Ligamentum teres uteri

## C. DIRECTIONS FOR DISSECTION AND STUDY

- ☐ 1. Review the reflections of the Peritoneum within the Pelvis, identifying:

Sigmoid Mesocolon

Pararectal Fossae

Paravesical Fossae

Transverse Vesical Fold (with empty bladder)

*Male*

Rectovesical Fossa

*Female*

Vesicouterine Fossa

Rectouterine Fossa (Douglas)

Broad Ligament

- ☐ 2. Review the inner surface of the Peritoneum above the Pelvis on the Anterior Abdominal wall, identifying the Medial and two Lateral Umbilical Folds. Trace the Inferior Epigastric Vessels to their origins on the External Iliac Artery and Vein.

- ☐ 3. Identify the exit in males of the Ductus Deferens, Internal Spermatic Vessels and External Spermatic branch of the Genitofemoral Nerve through the Abdominal Ring of the Inguinal Canal to the Scrotum; in females, the exit of the Round Ligament and nerve to the Labia Majora.
- ☐ 4. Also trace the Ilioinguinal Nerve onto the anterior abdominal wall to supply the Scrotum in males, and the Labia Majora in females.

#### EXTERNAL GENITALIA, MALE\*

##### Penis

- ☐ 5. Make a midline skin incision from the Pubis to the extremity of the Prepuce of the Penis. Observe the looseness and fibrous character of the superficial fascia (Dartos) as the skin is reflected to each side.
- ☐ 6. Identify the Suspensory Ligament extending from the middle of the Symphysis to attach to the deep fascia on each side of the Penis near its base. Complete removal of the skin.
- ☐ 7. Expose the Superficial Dorsal Vein going to the Superficial External Pudendal branch of the Great Saphenous Vein.
- ☐ 8. Remove the superficial fascia, then split the deep fascia in midline to expose the Deep Dorsal Vein, lying over the sulcus between the Corpora Cavernosa Penis. It drains the Glans and Corpora, passing deeply to the Symphysis to empty into the Pudendal Venous Plexus. (to be seen later)
- ☐ 9. On each side of the Deep Dorsal Vein, locate and trace the Dorsal Arteries and Nerves. The arteries originate from the Internal Pudendal Arteries; the nerves are branches of the Pudendal Nerve.
- ☐ 10. On one side, isolate the Corpus Cavernosum Penis from the Glans to the base. Divide it to identify the Profunda Artery which supplies this structure, and is also a branch of the Internal Pudendal Artery.
- ☐ 11. The Corpus Cavernosum Urethrae is supplied from the Urethral Artery (from the Internal Pudendal), and may be identified in a cross cut through that structure; also posteriorly, it is supplied by another branch to the Bulb.

##### Testes

- ☐ 12. Make an incision of the skin from the Inguinal Ring along the antero-lateral surface of the Scrotum to its lower end. Dissect away the skin to uncover the Dartos layer.

\* Female Genitalia, Nos. 18-27.

- ☐ 13. Split and separate the Dartos from the underlying External Spermatic Fascia on Cord and Testes, noting the incomplete septum formed by the Dartos. Try to identify branches of the Superficial and Deep External Pudendal Arteries and Veins; also, cutaneous rami from the External Spermatic branch of the Genitofemoral Nerve.
- ☐ 14. Split and separate the External Spermatic Fascia to identify the Cremasteric layer and its muscular fibers; then expose the Internal Spermatic Fascia (Transversalis).
- ☐ 15. Open the Internal Spermatic Fascia and separate to identify the Cord encircled with its Pampiniform Plexus of Veins, and the Tunica Vaginalis of the Testes.
- ☐ 16. Identify the structures composing the Cord:
- Ductus Deferens
  - Internal Spermatic Artery from Aorta
  - External Spermatic Artery from Inferior Epigastric Artery
  - Artery of Ductus Deferens from Superior Vesical Artery
  - Pampiniform Plexus into the Internal Spermatic Vein
  - Sympathetic Nerves of Spermatic and Pelvic Plexuses

- ☐ 17. Open the Tunica Vaginalis and study its extent. Review the Testes: structure, blood and nerve supply, and lymphatics. Read up Descent of the Testes.

## FEMALE GENITALIA

- ☐ 18. Place cadaver on back, with thighs flexed and abducted, legs fastened to racks as for dissection of the Perineum.
- ☐ 19. Within the Pelvis locate the following structures:
- |                |                |
|----------------|----------------|
| Bladder        | Ampulla        |
| Uterus         | Infundibulum   |
| Broad Ligament | Round Ligament |
| Ovaries        | Mesosalpinx    |
| Tubes          | Mesovarium     |
- ☐ 20. Study the Uterine Tubes, identifying the Infundibulum, Ampulla, Fimbriae, and Ostium (abdominal opening). Identify the Ligament of the Ovary.
- ☐ 21. By holding the Broad Ligament toward the light, the Epoophoron may be seen in the Mesosalpinx between the Tube and Ovary; it corresponds to the Epididymis in Males. The Paroophoron, located more medially, requires microscopic examination to identify.

- ☐ 22. Identify the following parts of the Vulva:

Mons Pubis	Frenulum
Labia Major	Fourchette
Anterior Commissure	Vestibulum
Posterior Commissure	Navicular Fossa
Labia Minor	Urethral Orifice
Clitoris	Hymen
Preputium Clitoridis	Vaginal Orifice

- ☐ 23. Spread the opening of the Vagina and note its rugae. Insert finger and identify by palpation the position of the Cervix. Note the axis of the Uterus in relation to that of the Vagina.
- ☐ 24. Also with finger in the Vagina, palpate the Cervix and Ovaries (holding them in position with the free hand) in order to identify their position on digital examination, and their feel. Note position of the Ureters to the Vaginal wall.
- ☐ 25. Insert a blunt probe through the Urethra into the Bladder, noting the direction and length of the Canal.
- ☐ 26. Dissect the skin from the pubic region and anterior half of the Labia Majora, also the mucous membrane on their under surface.
- ☐ 27. Removing the superficial fascia, identify labial branches from the Superficial and Deep External Pudendal Arteries, (both from the Femoral Artery) and branches from the Internal Pudendal Arteries; also cutaneous branches of the Ilioinguinal and Genitofemoral Nerves.
- ☐ 28. Try to identify the Suspensory Ligament of the Clitoris, identifying the two Corpora Cavernosa, and its free tip, the Glans Clitoridis. Try to identify the Deep Artery of the Clitoris in a cross section.

Study and describe the Female Pelvic Organs on page 499 and 500.

Review the Pelvic bones and joints. List the typical differences between Male and Female Pelves.

Briefly describe:  
CLITORIS

E X T E R N A L   G E N I T A L I A

BULBUS VESTIBULI

GLANDULAE VESTIBULARIS MAJORAE (Bartholini)

VAGINA



XLVIII  
PERINEUM, MALE AND FEMALE

A. TOPIC FOR DISCUSSION. Surgical and Obstetrical Considerations.

B. SPECIAL STUDY

*Nerves:*

Pudendus (S<sub>2</sub>, 3, 4)

Hemorrhoidalis inferior

Perinei (deep)

Scrotales (Labiales) posteriores

Dorsalis penis (Clitoridis)

Rami Perineales, (Cutaneus femoralis posterior, S<sub>1</sub>, 2, 3)

*Arteries:* Pudenda interna and branches

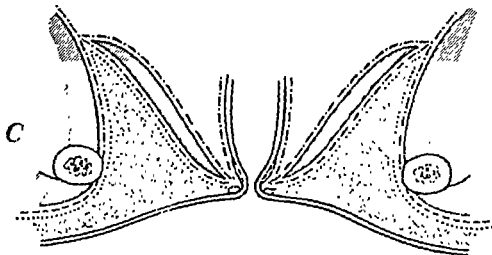
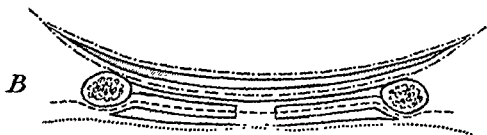
*Veins:* Pudenda interna and branches

C. DIRECTIONS FOR DISSECTION AND STUDY

Cadaver on back; thighs flexed and abducted, fastened to leg racks.

- ☐ 1. a. Close the anus, and in females, the (vaginal orifice) with stitches and make a skin incision around their margins.  
b. Complete a midline skin incision from the previously dissected area anteriorly, to an inch beyond the Coccyx.  
c. Incise the skin transversely from the outer margin of one Ischial tuberosity, to that of the other.
- ☐ 2. In reflecting the skin flaps, observe the radiating fibers of the Corrugator Cutis Ani muscle and the superficial position of the External Sphincter Ani. The latter is continuous with the Anococcygeal Raphe to the Coccyx posteriorly, and with the Central Tendinous Point of the Perineum anteriorly. Deeper fibers of the External Sphincter encircle the Anus posteriorly.
- ☐ 3. Lift only the fatty layer (Camper's) of superficial fascia taking care to identify the superficial vessels and nerves of the Perineum as directed below.
- ☐ 4. Anteriorly, trace through Colles' Fascia the Posterior Scrotal, or Labial Vessels and Nerves back toward the lateral corners of the Urogenital area.  
The vessels originate from the Internal Pudendal Artery and Veins; the nerves originate from Perineal branches of the Pudendal Nerve deeply, and superficially from similar branches of the Posterior Femoral Cutaneous Nerve, lying along the medial border of the Gluteus Maximus.





IDENTIFY THE FASCIAL PLANES OF THE PERINEUM

- ☐ 5. In the Anal region, trace the **Inferior Hemorrhoidal Vessels and Nerves** laterally for a short distance from the Anus for identification. Also try to identify the Perineal branch of the fourth Sacral Nerve near the Coccyx; it contributes toward supplying the External Sphincter muscle.
- ☐ 6. Observe the different character of the superficial fascia over the Ischial Tuberosities, also its continuity with the Dartos layer in the scrotal or labial regions.

ANAL TRIANGLE (Posterior half of the *Pelvic Diaphragm*)

- ☐ 7. Expose the medial borders of the Gluteus Maximus muscle and remove enough of it to uncover the Sacrotuberous Ligament and facilitate subsequent dissection.
- ☐ 8. Carefully remove the fat from the Ischiorectal Fossae tracing the **Inferior Hemorrhoidal Vessels and Nerves** toward the lateral (Obturator) wall.
- ☐ 9. Identify **Alcock's Canal**, formed by a split of the Obturator Fascia, and containing the **Internal Pudendal Vessels and Pudendal Nerve**.
- ☐ 10. Open the Canal and identify the origin of the **Inferior Hemorrhoidal Vessels and Nerves** from these structures; also trace backward the **Superficial Perineal (Scrotal or Labial) Vessels and Nerves** to their similar origin, noting their relation to the Superficial Transverse Perineal muscle as they pass anteriorly.
- ☐ 11. Expose the deeper course of the **Internal Pudendal Vessels and Deep Perineal Branch** of the Pudendal Nerve, from their exit beneath the Sacrotuberous Ligament to beneath the posterior border of the Urogenital Diaphragm.



## PERINEUM, MALE AND FEMALE (CONTINUED)

## DIRECTIONS FOR DISSECTION AND STUDY

## UROGENITAL TRIANGLE

- ☐ 1. Review the general morphology of the Urogenital Diaphragm and its relation to the anterior portion of the Pelvic Diaphragm (See First Dissection).
- ☐ 2. Remove the remaining portions of Colles' Fascia exposing the muscles, Ischiocavernosus, Bulbocavernosus and Superficial Transversus; and by lifting these muscles, expose the Crura of the Penis or Clitoris, the Bulb, and in females, the Greater Vestibular Glands (Bartholini) lying posteriorly to each half of the Bulb.
- ☐ 3. Trace the Internal Pudendal Artery forward cutting the lateral borders of the Inferior (Deep) Fascia of the Urogenital Diaphragm, the Deep Transversus and Sphincter Urethrae muscles, as necessary, to identify the branches to the Bulb, to the Crura of the Penis or Clitoris (Profunda), and by detaching the Crura, to the Dorsum of the Penis or Clitoris.
- ☐ 4. Also trace the Deep Perineal Branch of the Pudendal Nerve to the Dorsum of the Penis or Clitoris.
- ☐ 5. Locate in males, the Bulbourethral Glands (Cowper's) under the medial portion of the Deep Transversus muscle posteriorly to the Urethral canal.
- ☐ 6. Identify the Superior Layer of the Urogenital Diaphragm, the fascia (Transversalis origin) covering the inferior surface of the Levator Ani muscle, and which is continued in the Anal region as the Infra-anal Fascia.
- ☐ 7. Review the distribution of Fasciae upon the Pelvic Diaphragm, Urogenital Diaphragm, and Ischiorectal Fossae. Also, the structures contained in the Superficial and Deep Perineal Spaces.

Review and sketch the entire vascular supply of the Perineum and External Genitalia in both sexes; also the cutaneous and muscular innervation, including a diagram of the Pudendal Plexus and its branches.

Review the Levator Ani muscle, its attachments, blood and nerve supply.



L  
INTRAPELVIC STRUCTURES

A. TOPIC FOR DISCUSSION. Pelvic Topography.

B. SPECIAL STUDY

<i>Male</i>	<i>Female</i>
Apparatus Urogenitalia	Apparatus Urogenitalia
Ureter	Ureter
Vesica urinaria	Vesica urinaria
Urethra virilis	Urethra muliebris
Funiculus spermaticus	Ovarium
Testes	Tuba uterina
Prostata	Uterus
Vesicula seminalis	Vagina
Penis	Epoophoron
	Paroophoron

C. DIRECTIONS FOR DISSECTION AND STUDY

- ☐ 1. Review and identify the reflections of the Peritoneum in the Pelvis of both sexes.
- ☐ 2. Lift the Peritoneum from the surface of the Bladder and pulling the latter backward, insert finger between it and the Symphysis to locate the two thickenings of Pelvic (Transversalis) Fascia as the anterior True Ligaments of the Bladder (in males, Medial Puboprostatic; in females, Medial Pubovesical); they lie one on each side of the midline.
- ☐ 3. Move the finger laterally toward each side as far as the Ureter in males, or Broad Ligament in females, to observe the extent of the "Cave of Retzius." It is filled with loosely attached fat, which allows for wide extravasation of urine when the bladder is ruptured or punctured.
- ☐ 4. By blunt dissection, carefully complete reflection of the Peritoneum toward the Rectum in order to expose (but do not disturb) the underlying structures. In females, leave the Broad Ligament intact.
- ☐ 5. Clean away extraperitoneal fat to expose the course of the Ureters to the Bladder, noting in females their relation to the Uterus and Vagina.

In subsequent dissection observe presence of Lymph Nodes and their location, also the nerves forming the Sympathetic Plexuses.

- ☐ 6. Cleanly expose the **Common Iliac Arteries and Veins**; also their bifurcation into **External Iliac Vessels** for the lower extremity, and the **Hypogastric (O.T. Internal Iliac) Vessels** which supply the pelvic viscera and genitalia. Expose the branching of the **Hypogastric Arteries** into anterior and posterior divisions. Identify the **Middle Sacral Artery**.
- ☐ 7. Review by visual examination, or palpation, the relationships of the different parts of the male organs, as follows:
- Course and relations of the Ureters  
Course and relations of the Ductus Deferens  
Position of the Seminal Vesicles  
Location and relations of the Prostate  
Position and relations of the Bladder
- ☐ 8. Review the position and relationships of the following female structures:
- |                   |                |         |
|-------------------|----------------|---------|
| Broad Ligament    | Round Ligament | Vagina  |
| Uterus            | Ureters        | Cervix  |
| Tubes and Ovaries | Bladder        | Urethra |

## DIVISION OF PELVIS

- ☐ 9. a. Disarticulate the spinal column between the third and fourth Lumbar vertebrae (level of Umbilicus).  
b. Carefully cut all the intrapelvic structures in the exact sagittal plane of the body; begin with the Bladder, using a probe in the Urethra as a guide.  
    In males, continue the division through the Prostate and Rectum, and externally through the Penis, Perineum and Anus.  
    In females, follow the midline through the Bladder, Uterus, Urethra, Vagina and Rectum; and externally, through the Clitoris, Perineum and Anus.  
c. Separate the Symphysis with a knife and saw the Sacrum, Coccyx and Lumbar vertebrae in midline. Divide the Common Iliac vessels to retain the Aorta on one side, and the Vena Cava on the other.
- ☐ 10. Study the topography of the pelvic structures in the *sagittal plane*, noting especially the relations of the following:

<i>Male</i>	<i>Female</i>
Pelvic Diaphragm (Levator ani)	Pelvic Diaphragm (Levator ani)
Prostate	Urethra
Course of Urethra	Vagina
Bladder	Uterus and Cervix
Rectum	Bladder
	Rectum

Briefly describe:

C ARIA

Epoophoron (Parovarium, Rosenmüller's)

Paroophoron

TUBA UTERINA (FALLOPII)



500  
UTERUS

INTRAPELVIC STRUCTURES

L I  
GENITOURINARY ORGANS, MALE\*

A. TOPIC FOR DISCUSSION. Embryological Development.

B. SPECIAL STUDY

*Nerves:*

Plexus spermaticus

Plexus hypogastricus and parts

Hemorrhoidalis medius

Vesicalis

Prostaticus

Plexus pudendus (Spinal) and branches

*Arteries:*

Hypogastrica and branches

Spermatica interna

*Veins:*

Hypogastrica and branches

Spermatica interna

C. DIRECTIONS FOR DISSECTION AND STUDY

- ☐ 1. Review the course of the Ureters in relation to the External Iliac Vessels Spermatic Cord, Seminal Vesicles and Prostate.
- ☐ 2. Cleanly expose the Hypogastric Artery noting presence of nerve strands and of lymph nodes. Identify its bifurcation. Also expose the Hypogastric Vein.
- ☐ 3. On the anterior division of the Hypogastric Artery, identify the Obliterated Umbilical Artery and follow it forward upon the anterior abdominal wall. An inch or more of its proximal portion will have a lumen.
- ☐ 4. Trace the Superior Vesical Artery and Vein to the Bladder; the artery originates from the open portion of the Umbilical Artery, and the vein drains into the Hypogastric Vein. The Middle Vesical Artery may originate as a branch of this Artery.
- ☐ 5. Expose the intrapelvic course of the Obturator Vessels to their point of exit at the upper margin of the Obturator Foramen. The Obturator Nerve should be identified and partly uncovered.
- ☐ 6. Trace the Vesical branches of the Obturator vessels to the Bladder; the latter vessels also give off Iliac and Pubic branches to the pelvic muscles and bones.

\* Female, Chapter LII.

- ☐ 7. By blunt dissection, displace the Rectum medially to identify and trace its vascular supply, arterial and venous.

*Arteries:*

Superior Hemorrhoidal—from Inferior Mesenteric

Middle Hemorrhoidal—from Hypogastric

Inferior Hemorrhoidal—from Internal Pudendal (Hypogastric)

*Veins:*

Superior Hemorrhoidal—into Inferior Mesenteric (Portal)

Middle Hemorrhoidal—Hypogastric (Systemic)

Inferior Hemorrhoidal—Internal Pudendal (Systemic)

- ☐ 8. Trace the Middle and Inferior Vesical Arteries and Veins to the Bladder and Seminal Vesicles, noting their origins and points of drainage.
- ☐ 9. Identify the Venous Plexus of the Prostate and Bladder; the Dorsal Vein of the Penis drains into it.
- ☐ 10. Expose the lateral side of the Prostate, by displacing it medially in order to identify its source of blood supply. (See ¶14.)
- ☐ 11. Identify the different portions of the Urethra—Prostatic, Membranous and Pars Cavernosa—noting their comparative lengths.
- ☐ 12. Open the Seminal Vesicles and probe with a bristle, the Ejaculatory Ducts to their openings on the Prostatic Utricle. Also open the Ampulla of the Ductus Deferens and probe with another bristle, noting its common exit with the Ejaculatory Duct.
- ☐ 13. Review the Urethra in detail, and the glands emptying into it; also the Penis, its parts and erectile mechanism.
- ☐ 14. Review the vascular supply of the male Urogenital structures.

*Arteries:*

*Bladder* Superior, Middle, and Inferior Vesical (Hypogastric)  
Rami from Obturator and Inferior Gluteal

*Seminal Vesicles* Rami from Middle and Inferior Vesical

*Prostate* Rami from Inferior Vesical, Middle Hemorrhoidal, Inferior Gluteal

*Penis* Internal Pudendal, Dorsal, Deep and Bulbar

*Testes* Internal Spermatie

*Veins:*

*Bladder* Vesical Plexus by Vesical Veins to Hypogastric

*Seminal Vesicles* Vesical Plexus to Hypogastric

*Prostate* Prostatic Plexus to Hypogastric

*Penis* Prostatic and Pudendal Plexus, also Saphenous Vein

*Testes* Pampiniform Plexus to Internal Spermatie

- ☐ 15. Study and review the Nerves to the male Pelvic structures:

*Extrapelvic*, Iliioinguinal and Genitofemoral (External Spermatic)

Pudendal branches to Scrotum and Penis

Posterior Femoral Cutaneous, Perineal branches

*Intrapelvic Plexuses*, Spermatic and Hypogastric (Vesical and Prostatic)

- ☐ 16. Review the structure of the Kidneys, Bladder, Ureters and Prostate; also the Testes and Cord, and their fascial coverings.

Proceed with study of the Female Organs, Chapter LII.

Draw a diagram of the branches of the anterior division of the Hypogastric Artery and their destinations in males; include other sources of arterial supply to the pelvic structures.



## GENITOURINARY ORGANS, FEMALE

A. TOPICS FOR DISCUSSION. Pregnancy and Parturition.

B. SPECIAL STUDY

*Nerves:*

Plexus ovaricus

Plexus hypogastricus and parts

Hemorrhoidalis medius

Vesicalis

Uterovaginalis

Plexus pudendus (spinal) and branches

*Arteries:*

Hypogastrica and branches

Ovarica

*Veins:*

Hypogastrica and branches

Ovarica

C. DIRECTIONS FOR DISSECTION AND STUDY

- ☐ 1. Review the course of the Ureters in relation to the External Iliac Vessels, Broad Ligament, Uterus, Round Ligament, and Vagina.
- ☐ 2. Cleanly expose the Hypogastric Artery noting presence of nerve strands and of lymph nodes. Identify its bifurcation into anterior and posterior divisions. Also expose the Hypogastric Vein.
- ☐ 3. On the anterior division of the Hypogastric Artery, identify the Obliterated Umbilical Artery and follow it forward upon the anterior abdominal wall. An inch or more of its proximal portion will have a lumen.
- ☐ 4. Trace the Superior Vesical Artery and Vein to the Bladder; the artery originates from the open portion of the Umbilical Artery, and the vein drains into the Hypogastric Vein. Identify the origin of the Uterine Artery, either from the Umbilical or anterior division of the Hypogastric Arteries. Trace to the Uterus; also trace the Uterine Vein.
- ☐ 5. Expose the intrapelvic course of the Obturator Vessels to their point of exit at the upper margin of the Obturator Foramen. The Obturator Nerve should be identified and partly uncovered.

- ☐ 6. Trace the Vesical branches of the Obturator Vessels to the Bladder; the latter also give off Iliac and Pubic branches to the Pelvic muscles and bones.
- ☐ 7. By blunt dissection, displace the Rectum medially to identify and trace its vascular supply, arterial and venous.

*Arteries:*

Superior Hemorrhoidal—from Inferior Mesenteric

Middle Hemorrhoidal—from Hypogastric

Inferior Hemorrhoidal—from Internal Pudendal (Hypogastric)

*Veins:*

Superior Hemorrhoidal—into Inferior Mesenteric (Portal)

Middle Hemorrhoidal—Hypogastric (Systemic)

Inferior Hemorrhoidal—Internal Pudendal (Systemic)

- ☐ 8. Locate the Ovarian Vessels and trace them medially to the Uterus, and to the Aorta and Vena Cava.
- ☐ 9. From the Hypogastric Vessels retrace the Uterine Artery and Vein to the body of the Uterus and identify the arterial anastomosis with the Ovarian.
- ☐ 10. Locate the Vaginal Arteries and Veins and trace their course. They tend to correspond to the Inferior Vesical vessels in males. Identify the anastomoses of these arteries with the Uterine. Also try to locate the Vaginal branches from the Middle Hemorrhoidal and Internal Pudendal Arteries.

What are the Azygos Arteries of the Vagina?.....

.....

- ☐ 11. The Middle Vesical Artery may originate from the Superior Vesical. Locate its origin and course.
- ☐ 12. Identify the Uterovaginal Venous Plexus, its routes of drainage and communications.

.....

.....

- ☐ 13. Examine the Cervix, its protrusion into the Vagina forming Anterior, Posterior and Lateral Fornices.
- ☐ 14. Locate and probe the uterine orifices of the Tubes.
- ☐ 15. Study the structure of the Uterus, Tubes, Ovaries, and Vagina; review their relations and ligaments.

- ☐ 16. Review the entire female Urinary tract: Kidneys, Ureters, Bladder and Urethra.
- ☐ 17. Review the vascular supply of the female pelvic organs.

**Arteries:**

<i>Bladder</i>	Superior and Middle Vesical (Hypogastric) Rami from Obturator and Inferior Gluteal, also from Uterine and Vaginal
<i>Ovaries</i>	Ovarian (Aorta)
<i>Uterus</i>	Uterine (Hypogastric), Ovarian (Aorta)
<i>Vagina</i>	Vaginal, Middle Hemorrhoidal, Internal Pudendal

**Veins:**

<i>Bladder</i>	Vesical Plexus, by Vesical Veins to Hypogastric
<i>Ovaries</i>	Pampiniform Plexus to Ovarian (Vena Cava)
<i>Uterus</i>	Uterine Plexus, through Uterine and Vaginal Veins (Hypogastric), also Ovarian (Vena Cava)
<i>Vagina</i>	Vaginal Plexus through Vaginal Veins

- ☐ 18. Review the nerves to the Female Pelvic Structures.

*Extrapelvic*, Ilioinguinal, Genitofemoral, and Pudendal branches to Labia and Clitoris  
Posterior Femoral Cutaneous, Perineal branches  
*Intrapelvic*, Plexuses, Ovarian, and Hypogastric (Uterine and Vaginal)

Study the Genitourinary structures of the Male as directed in Chapter LI.

Draw a diagram of the branches of the anterior division of the Hypogastric Artery and their destinations in females; include other sources of arterial supply to the pelvic structures.

Work out the channels of venous collateral circulation in the following:

- a. Obstruction to the Portal Vein
- b. Obstruction to the Inferior Vena Cava

Briefly describe the Lymphatics of the Pelvic Viscera.





L I I I  
PELVIC STRUCTURES (COMPLETED)

A. TOPIC FOR DISCUSSION. Lumbosacral Plexus.

B. SPECIAL STUDY

*Nerves:* Plexus Lumbosacralis

*Arteries:*

Lumbales

Iliacae communes and branches

Sacralis media

*Veins:*

Lumbales

Iliacae communes and branches

Sacrales mediales

C. DIRECTIONS FOR DISSECTION AND STUDY

- ☐ 1. Review the Abdominal Aorta, identifying the Lumbar Branches.
- ☐ 2. Review the Middle Sacral Artery noting its passage beneath the Left Common Iliac Vein along the midline of the Sacrum.
- ☐ 3. Review the Psoas Major and Minor, and Quadratus Lumborum muscles.

LUMBAR PLEXUS

- ☐ 4. Review the Genitofemoral Nerve lying on the Psoas muscle, identifying its branches to form (a) the External Spermatic Nerve, going through the Inguinal Canal to the Cremaster muscle and Scrotum in males, the Labia majora in females; and (b) the Lumboinguinal Nerve, following the External Iliac Artery under the Inguinal Ligament to the skin of the Femoral Triangle.
- ☐ 5. Pick up the Lateral Femoral Cutaneous Nerve and retrace its course from beneath the lateral attachment of the Inguinal Ligament, across the Iliacus muscle; observe its relation to the Psoas. It supplies the skin on the lateral surface of the Thigh.
- ☐ 6. Similarly, locate the Ilioinguinal Nerve at the outer border of the Psoas, and trace it laterally through the Transverse and Internal Oblique muscles and the Subcutaneous Inguinal Ring, to the Scrotum or Labia and the adjacent medial surface of the thigh.

- ☐ 7. Trace the Iliohypogastric Nerve in the same manner, identifying its branching into anterior and lateral cutaneous divisions. The anterior supplies the skin of the suprapubic region, the lateral bends posteriorly toward the gluteal region.
- ☐ 8. Similarly, locate and expose the course of the twelfth Thoracic Nerve. Its anterior branch parallels the other Thoracic nerves across the abdomen; the lateral branch descends over the crest of the Ilium upon the lateral surface of the hip.
- ☐ 9. Work out the origins of the foregoing nerves by dissecting away the Psoas muscles to expose their vertebral roots. Identify their communications with the Lumbar Sympathetic Ganglia.
- ☐ 10. Isolate the belly of the Psoas Major at the rim of the Pelvis, lifting the External Iliac vessels. Identify the Femoral, Obturator and Accessory Obturator\* Nerves.
- ☐ 11. Review the nerves of the Lumbar Plexus, identifying their roots as follows:
- |                                  |                        |
|----------------------------------|------------------------|
| Iliohypogastric                  | (T <sub>12</sub> ) L 1 |
| Ilioinguinal                     | L 1                    |
| Genitofemoral                    | L 1, 2                 |
| Lateral Femoral Cutaneous        | L 2, 3                 |
| Femoral                          | L 2, 3, 4              |
| Obturator                        | L 2, 3, 4              |
| (Accessory Obturator—inconstant) | L (2), 3, 4            |
- ☐ 12. Complete the removal of the Pelvic Fascia and fat, reviewing the branches of the anterior division of the Hypogastric Artery. Similarly, review the corresponding branches of the Hypogastric Vein.
- ☐ 13. Expose the posterior division of the Hypogastric Artery and its branches, with their accompanying veins, being careful not to injure adjacent nerves.
- |                         |  |
|-------------------------|--|
| <i>Iliolumbar</i>       | branching to (a) Quadratus and Psoas, and (b) Iliacus.   |
| <i>Lateral Sacral</i>   | follows Sacral Foramina to Coccyx.   |
| <i>Superior Gluteal</i> | terminal branch. Its exit through the Sciatic Foramen on the Piriformis muscle will be seen later. |
- ☐ 14. Displace the intrapelvic vessels downward cutting the Iliolumbar and Lateral Sacral vessels near their origins.
- ☐ 15. On the surface of the Sacrum, trace the Sympathetic Trunk identifying its ganglia and their connections with the Sacral Plexus.

\* Inconstant.

- 16. Uncover the Lumbosacral Trunk and the four upper Sacral roots lying on the Piriformis muscle; also observe the passage of the Superior and Inferior Gluteal and Internal Pudendal Arteries in relation to parts of the Sacral Plexus.
  - 17. Identify the Muscular branches from Sacral 4 to the Coccygeus, Levator Ani and External Sphincter muscles; also a branch from Sacral 5 to the Coccygeus.
  - 18. Divide the sacral attachment of the Coccygeus to expose the beginning of the Great Sciatic Nerve (L 4, 5, S 1, 2, 3).
  - 19. Identify the origin of the Pudendal Nerve (Sacral 2, 3, 4) and follow the Internal Pudendal Vessels through the Greater Sciatic Foramen, running posterior to the Sacrospinous Ligament to enter the Anal Triangle, as previously seen.
- Note:* Other branches of the Sacral Plexus are inaccessible at this stage, and will be dissected in connection with structures of the Gluteal region.
- 20. Study the course of the Ascending Lumbar Veins as the origins of the Azygos and Hemiazygos Veins.

Make a sketch of the Lumbosacral Plexus in three colors, to identify the respective segments of the Lumbar, and of the Anterior and Posterior parts of the Sacral Plexuses. Indicate the Pudendal and Coccygeal portions.



## SUPERFICIAL THIGH AND FEMORAL CANAL

A. TOPICS FOR DISCUSSION. Femoral Hernia. Varicose Veins.

## B. SPECIAL STUDY

*Nerves:**Anterior*

Ilioinguinalis  
 Lumboinguinalis  
 Cutaneus femoralis lateralis  
 Cutaneus intermedius (anterior)  
 Cutaneus medialis  
 Saphenus (Infrapatellar)

*Posterior*

Rami Lumbales 1, 2, 3  
 Rami Sacrales  
 Rami Thoracalis 12  
 Iliohypogastricus  
 Cutaneus femoralis posterior  
 Clunium inferiores  
 Cutaneus perforans

*Arteries:*

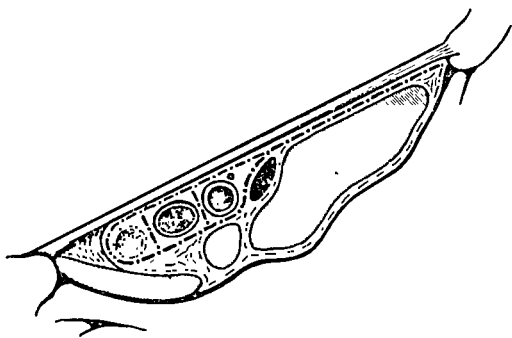
Epigastrica superficialis  
 Circumflexa ilium superficialis  
 Pudenda externa superficialis  
 Genu suprema

*Veins:*

Saphena magna  
 Epigastrica superficialis  
 Circumflexa ilium superficialis  
 Pudenda externa superficialis

## C. DIRECTIONS FOR DISSECTION AND STUDY

- 1. Make a skin incision down the midline of the thigh anteriorly as far as the Tibial Tubercle below the knee, then a transverse incision at that level. Reflect the skin toward each side. At the knee try to identify the Prepatellar Bursa over the Patella and its tendon.
- 2. Identify the Great Saphenous Vein and expose its course from the Fossa Ovalis to below the knee. Note presence of Lymph Nodes along the proximal portion of the Vein and adjacent to the Inguinal Ligament.
- 3. Starting from the Fossa Ovalis, trace laterally the Superficial Epigastric, and Superficial Circumflex Iliac Arteries and Veins; at the same time look for the terminal twigs of the Lumboinguinal nerves near the Fossa, and more laterally the trunk of the Lateral Femoral Cutaneous Nerve; also the lateral cutaneous branches from Thoracic 12, extending downward on the lateral aspect of the hip.



IDENTIFY THE STRUCTURES AND FASCIA

- ☐ 4. Trace medially the Superficial External Pudendal Artery and Vein going to the pubic region and external genitalia. Fibers of the Ilioinguinal Nerve may be seen.
- ☐ 5. Follow the main course of the Lateral Femoral Cutaneous Nerve down the antero-lateral aspect of the thigh.
- ☐ 6. Between the Lateral Femoral Cutaneous Nerve and the Great Saphenous Vein, locate the two Intermediate Anterior Cutaneous branches of the Femoral Nerve, and trace their course toward the knee.
- ☐ 7. Another division of the Femoral Nerve, the Medial Anterior Cutaneous, sends branches to the medial aspect of the thigh; the main trunk lies under the Fascia Lata parallel (anteriorly) with the Saphenous Vein, and emerges in the lower third of the thigh. Branches are given off to the skin in the more proximal area; they should be identified.
- ☐ 8. Near the knee on the medial side, locate the exit of the Infrapatellar branches of the Saphenous Nerve, a division of the Femoral. Trace from their exit in front of the Saphenous Vein to below the Patella.
- ☐ 9. Try to identify terminal endings of the Lateral, Middle, and Medial Cutaneous and Infrapatellar Nerves interlacing in the Patellar region to form the Patellar Plexus; also trace the Genu Suprema Artery from its point of exit through the Fascia Lata.

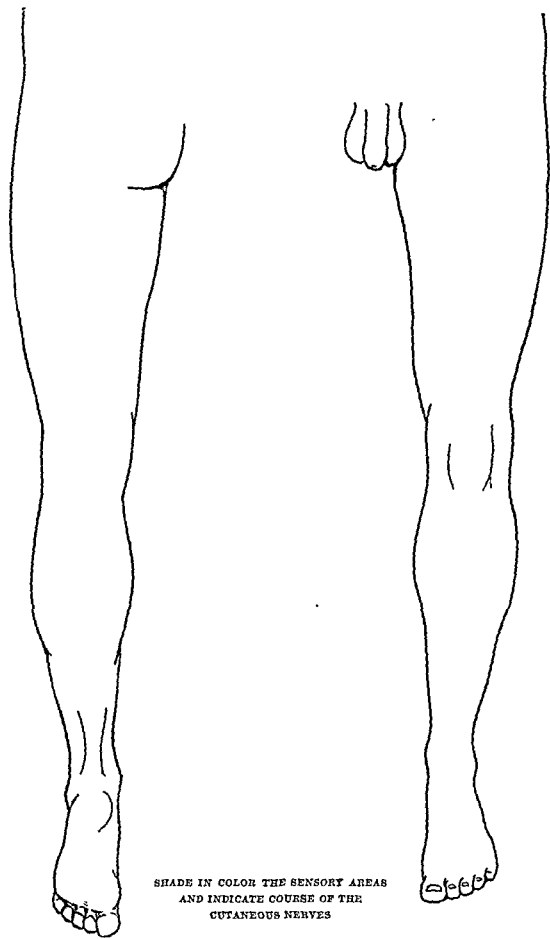
## FEMORAL CANAL

- ☐ 10. Remove the superficial fascia from the upper thigh to expose the Fossa Ovalis. Clearly define the margins of the Fossa and review the continuity of fascia by which the Fossa is formed.
- ☐ 11. Review the Femoral Sheath, its compartments and source. Trace the continuity of the anterior and posterior walls of the Femoral Sheath with the Transversalis Fascia inside the Pelvis.
- ☐ 12. Within the Pelvis identify the positions of the External Iliac Vessels, Femoral Nerve, also the Femoral Ring and Canal. Below the Inguinal Ligament, cut the Fascia Lata sufficiently to review their position as they enter the thigh.

## POSTERIOR SURFACE

- ☐ 13. Complete the removal of the skin from the posterior thigh and gluteal regions.
- ☐ 14. From the Iliac Crest trace the main course of the lateral ramus of the Iliohypogastric Nerve.





SHADE IN COLOR THE SENSORY AREAS  
AND INDICATE COURSE OF THE  
CUTANEOUS NERVES

- ☐ 15. Nearer the vertebral column, posterior rami of the upper three Lumbar Nerves cross the Iliac Crest to supply the posterior surface of the buttocks. Locate and trace their main course.
- ☐ 16. Along the medial margin of the Gluteus maximus, locate posterior rami of Sacral Nerves; and lower, gluteal branches given off from the Perforating Cutaneous, and Posterior Femoral Cutaneous Nerves. Locate the latter by following the inferior border of the Gluteus Maximus muscle.
- ☐ 17. The Posterior Femoral Cutaneous Nerve runs down the middle of the posterior aspect of the thigh under cover of the Fascia Lata, giving off cutaneous branches along its course. Incise the superficial fascia in midline and reflect toward each side, identifying and tracing the superficial branches of this nerve from their points of exit.



## ANTERIOR THIGH AND KNEE

A. TOPIC FOR DISCUSSION. Patellar Bursae.

B. SPECIAL STUDY

*Nerves:*

Femoralis and branches  
Obturatorius  
Obturatorius accessorius

*Arteries:*

Femoralis and branches  
Profunda femoris and branches

*Veins:*

Femoralis and branches  
Profunda femoris and branches

C. DIRECTIONS FOR DISSECTION AND STUDY

- ☐ 1. Dissect away the superficial fascia from the front and sides of the thigh preserving the main trunks of the Cutaneous Nerves. Study the Fascia Lata identifying the Iliotibial Tract.
- ☐ 2. Cut the Fascia Lata below the Inguinal Ligament from the Anterior Superior Iliac Spine medially through the superior cornu of the Fossa Ovalis. Reflect downwards to the lower level of the Fossa in order to identify the exit of the Lateral Cutaneous, Lumboinguinal and Femoral Nerves from the Abdomen.
- ☐ 3. Split the Fascia Lata from the points of exits of the Medial and Intermediate Anterior Cutaneous Nerves to their origin on the Femoral Nerve. Similarly, trace the course of the Lateral Cutaneous Nerve.
- ☐ 4. Review the boundaries of the Femoral Triangle. From the lower cornu of the Fossa Ovalis, cut the Fascia Lata medially to the border of the Gracilis muscle, then downwards to the Medial Epicondyle.
- ☐ 5. Reflect the Fascia laterally to the Iliotibial Tract to expose the anterior muscles of the thigh, preserving the Saphenous Vein if possible. Identify the Lateral Intermuscular Septum between the Vastus Lateralis and Biceps; also the Medial Septum between the Vastus Medialis and the Adductors.

- ☐ 6. Isolate the Sartorius muscle identifying its innervation from the Femoral Nerve and pull it laterally to uncover the Adductor Canal (Hunter). Identify the muscles forming the canal, dividing the Sartorius about three inches above the knee.
- ☐ 7. Returning to the Triangle, isolate the proximal end of the thigh muscles sufficiently to identify the *origins* of the branches of the Femoral Nerve.

*Cutaneous*      Medial  
                      Intermediate Anterior  
                      Saphenous (to lower leg)

*Muscular*      Sartorius  
                      Rectus Femoris  
                      Vastus Lateralis  
                      Vastus Intermedius (also Articular Genu)  
                      Vastus Medialis  
                      Pectineus (passing behind vessels)

*Note:* Identify the rami to the Iliacus within the Pelvis.

- ☐ 8. Identify the origins of the Superficial Epigastric, Iliac Circumflex and Superficial External Pudendal Arteries, and the drainage point of the associated veins. More deeply locate the origin of the Deep Femoral Artery.
- ☐ 9. Follow the Deep Femoral Artery to its Medial and Lateral Femoral Circumflex branches; continue tracing the latter to locate its Ascending, Transverse, and Descending branches. Medially, identify the origin of the Deep External Pudendal Artery.
- ☐ 10. Identify the origin and proximal portion of the Deep Femoral Vein.
- ☐ 11. Remove the areolar tissue from the Adductor Canal and, in doing so, try to identify the network of nerve fibers forming the "Subsartorial Plexus," branches being contributed from the Medial Cutaneous, Saphenous and Obturator Nerves.
- ☐ 12. Observe the positions of the Femoral Artery and Vein, and Saphenous Nerve in the canal; also identify their muscular branches, and the nerve to the Vastus Medialis.
- ☐ 13. Follow the Canal to its terminus in a tendinous arch in the insertion of the Adductor Magnus, through which the Femoral vessels pass posteriorly.
- ☐ 14. Locate the origin of the Genu Suprema Artery from the Femoral and trace its course to the front of the knee; also the origin and course of the Infrapatellar Nerve from the Saphenous.

- ☐ 15. Remove the Fascia Lata from the Adductors, including the Pectineal Fascia.
- ☐ 16. Cut the Adductor Longus near its origin and reflect forward. Locate the anterior division of the Obturator Nerve and its branches to this muscle, the Gracilis, and Adductor Brevis. Also cut the Pectineus similarly for more complete exposure and identify the Accessory Obturator Nerve, if present. Locate the passage of both nerves through the pelvic floor.
- ☐ 17. Cut the Adductor Brevis near its origin, and carefully locate the posterior division of the Obturator Nerve and its branches to the Adductor Magnus, and Brevis. The Accessory Obturator usually goes to the hip joint, with a branch to the Pectineus, and one to the Obturator Nerve.
- ☐ 18. Isolate and divide the Rectus Femoris at its midpoint to follow the branches of the Femoral Nerve to each of the Vasti Muscles. Separate the fibres of the Vastus Intermedius to locate the small Articularis Genu muscle.
- ☐ 19. Cut away the Fascia Lata along the anterior border of the Iliotibial Tract. Isolate the Tensor Fasciae Latae identifying on the under surface its innervation from the Superior Gluteal Nerve.
- ☐ 20. Expose the course of the Deep Femoral Artery between the Adductors Longus and Magnus, and identify its four Perforating Arteries piercing the Adductor Magnus. Review the course of the Lateral and Medial Femoral Circumflex Arteries.

List the muscles of the anterior and medial parts of the thigh according to their nerve supply; review their actions and morphology.

Review the Femur, the Hip Joint and its ligaments.



LVI  
GLUTEAL REGION

A. TOPIC FOR DISCUSSION. Arterial Anastomoses about the Hip.

B. SPECIAL STUDY

*Nerves:*

Ischiadicus

Gluteus superior

Gluteus inferior

Cutaneus femoralis posterior

N. to Quadratus femoris and Gemellus inferior

N. to Obturator internus and Gemellus superior

N. to Piriformis

*Arteries:*

Glutea superior

Glutea inferior

Profunda femoris and branches

Obturatoria and branches

*Veins:*

Glutea superior

Glutea inferior

Bursae subglutaeae

C. DIRECTIONS FOR DISSECTION AND STUDY

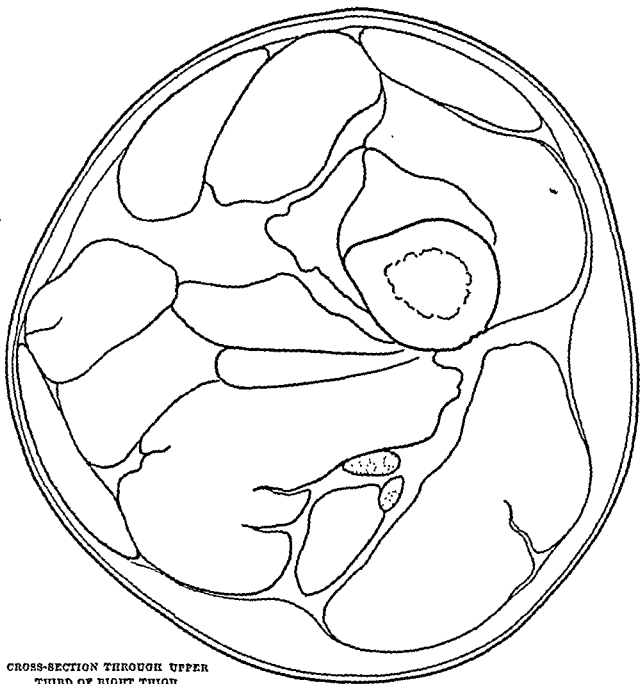
- ☐ 1. Remove the remaining superficial fascia from the buttocks and thigh as far as the knee, retaining the main branches of the Cutaneous nerves.
- ☐ 2. Dissect the deep fascia covering the Gluteus Maximus laterally, noting its coarse fasciculi dipping into the muscle; also observe that along its lateral border, the fascia on the upper and deep surfaces of this muscle unite to cover the external surface of the Gluteus Medius muscle.
- ☐ 3. Below the Gluteus, make a midline incision through the deep fascia to expose the Posterior Femoral Cutaneous Nerve as far as the knee; raise the flaps to each side and review the Lateral and Medial Intermuscular Septa.
- ☐ 4. Divide carefully the Gluteus Maximus muscle about an inch from its insertion, slowly reflect it medially to avoid injury to the subjacent vessels and nerves, identifying them as they are brought to view.
- ☐ 5. Branches of the Inferior Gluteal Vessels and Nerve which enter the muscle should be cut near its surface, or with a small piece of the muscle attached. The Superior Gluteal Vessels enter it from above the Piriformis muscle, and should be treated similarly.



- ☐ 6. Complete the reflection and removal of this muscle, identifying the Sacral Nerves and Vessels which pierce it parallel to its medial border.
- ☐ 7. Identify the three bursa underlying the Gluteus Maximus located upon:
  - a. Ischial Tuberosity
  - b. Great Trochanter
  - c. Proximal portion of the Vastus Lateralis
- ☐ 8. Trace the Posterior Femoral Cutaneous Nerve (O.T. "Small Sciatic") upward to its pelvic entrance with the Inferior Gluteal Nerve, below the Piriformis.
- ☐ 9. Expose the proximal portion of the Great Sciatic Nerve; observe whether it has a single or a divided trunk, and its relations to the Piriformis.
- ☐ 10. Medially locate the position of the Pudendal Nerve and Vessels.
- ☐ 11. By lifting the Sciatic Nerve laterally, identify the small nerves to:
  - a. Obturator Internus and Superior Gemellus
  - b. Inferior Gemellus and Quadratus Femoris
- ☐ 12. On the medial (tibial) side of the Sciatic Nerve just above its passage anterior to the Biceps Femoris, identify the origins of the branches to the hamstring muscles.
- ☐ 13. Expose the Gluteus Medius; then cut it near its insertion and reflect upward. Identify and divide the branches of the Superior Gluteal vessels and nerve entering it; then study their major course and distribution to the Gluteus Minimus and Tensor Fasciae Latae.
- ☐ 14. Reflect the Tensor Fasciae and identify the anastomosis between branches of the Superior Gluteal Artery and the Ascending branch of the Lateral Femoral Circumflex from the Deep Femoral Artery.
- ☐ 15. Divide the Piriformis near its insertion and reflect to study the continuity of the Gluteal vessels with their intrapelvic portions; also, the continuity of the nerves in this region with the Sacral Plexus.
- ☐ 16. Review the Sacrospinous and Sacrotuberous Ligaments; also the Greater and Lesser Sciatic Foramina, and the structures which pass through each of them.

- ☐ 17. At the lower border of the Quadratus Femoris (sometimes also at the upper border), branches of the Ascending division of the Medial Femoral Circumflex Artery pass posteriorly to anastomose with branches from the Inferior Gluteal Artery. Identify such anastomoses.
- ☐ 18. Locate the Perforating Artery I from the Deep Femoral, running posteriorly between the proximal and middle portions of the Adductor Magnus. This artery also anastomoses with the Medial and Lateral Femoral Circumflex, and the Inferior Gluteal Arteries. Trace out these connections, as they form the "Crucial Anastomosis" which compensates for ligation of the Femoral Artery.
- ☐ 19. Divide the Obturator Internus and two Gemelli muscles medial to the Sciatic Nerve and reflect to expose the course of the Nerve to the Quadratus Femoris and Inferior Gemellus.
- ☐ 20. Divide the Quadratus and reflect to expose:
  - a. Capsule of Hip Joint
  - b. Insertions of Iliopsoas and Obturator Externus
  - c. Course of the Medial Femoral Circumflex Artery
- ☐ 21. Try to locate an anastomosis between the Inferior Gluteal, and the posterior branch of the Obturator Artery which runs posteriorly beneath the External Obturator muscle.
- ☐ 22. Cut the Gluteus Minimus near its insertion to expose the upper portion of the Joint Capsule and the tendon of the Rectus Femoris.
- ☐ 23. Review the Lumbosacral Plexus in its entirety.
- ☐ 24. Sketch the arterial anastomoses about the Hip.

Review the Muscles, intrapelvic and extrapelvic, their actions, morphology and nerve supply.



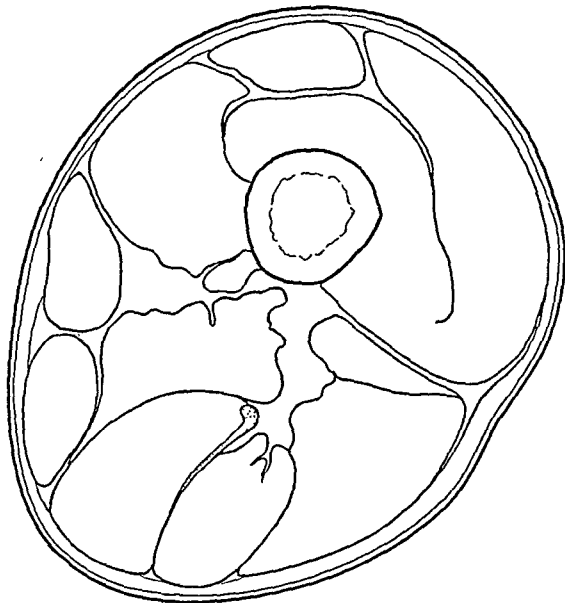
CROSS-SECTION THROUGH UPPER  
THIRD OF RIGHT THIGH

Identify the following—

Sartorius	Tensor Fasciae Latae	Gracilis
Rectus Femoris	Adductor Longus	Semitendinosus
Vastus Medialis	Adductor Brevis	Semimembranosus tendon
Vastus Intermedius	Adductor Minimus	Biceps (Long head) tendon
Vastus Lateralis	Adductor Magnus	Gluteus Maximus
	Pectineus	

Locate and label the following—

Arteries	Veins	Nerves
Femoral	Femoral	Lateral Femoral Cutaneous
Deep Femoral	Great Saphenous	Rami of Intermediate Anterior Cutaneous
First Perforating	Deep Femoral	Medial (Femoral) Cutaneous
		Femoral Saphenous
Lateral Intermuscular Septum		Obturator (Anterior and Posterior rami)
Medial Intermuscular Septum		Sciatic
		Posterior Femoral Cutaneous



CROSS SECTION AT JUNCTION OF MIDDLE AND LOWER THIRDS OF RIGHT THIGH

Identify the following—

Rectus Femoris  
Vastus Medialis  
Vastus Intermedius  
Vastus Lateralis  
Sartorius  
Gracilis

Adductor Longus  
Adductor Magnus  
Semimembranosus  
Semitendinosus  
Biceps (Long head)  
Biceps (Short head)

Locate and label the following—

*Arteries*

Femoral  
Deep Femoral  
Third Perforating

*Veins*

Femoral  
Great Saphenous  
Deep Femoral

*Nerves*

Medial (Femoral) Cutaneous  
Intermediate Anterior Cutaneous  
Lateral Femoral Cutaneous  
Saphenous  
Sciatic  
Posterior Femoral Cutaneous

Lateral Intermuscular Septum  
Medial Intermuscular Septum



# POSTERIOR THIGH AND POPLITEAL SPACE

## A. TOPIC FOR DISCUSSION. Injuries of Knee Joint.

## B. SPECIAL STUDY

### *Nerves:*

Obturatorius (Genicular branch)

Ischiadicus

Rami musculares

Tibialis

Cutaneus surae medialis

Rami articulares

Rami musculares

Peroneus communis

Cutaneus surae lateralis

Communicans fibularis

Rami articulares

### *Arteries:*

Poplitea and branches

Rami musculares

Rami articulares

### *Veins:*

Poplitea and branches

Saphena parva

## C. DIRECTIONS FOR DISSECTION AND STUDY

- ☐ 1. Extend removal of skin to include the upper half of the leg posteriorly.
- ☐ 2. In the region of the knee, review the Infrapatellar Nerve anterior to the Great Saphenous Vein; posteriorly to the vein, locate the exit of the Saphenous Nerve and trace both vein and nerve downward through the superficial fascia, noting their relation.
- ☐ 3. Laterally, identify the exit of the Lateral Sural Cutaneous Nerve (from the Common Peroneal) near the inner border of the tendon of the Biceps Femoris; and more medially, the exit of an Anastomotic Branch of the same nerve. Trace them within the exposed area.
- ☐ 4. Distally, locate the exit of the Small Saphenous Vein about the middle of the calf and near it the exit of the Medial Sural Cutaneous Nerve.



- ☐ 5. Remove the superficial fascia, preserving the Cutaneous Nerves; observe anastomotic branches between the Saphenous and Small Saphenous Veins.
- ☐ 6. Incise the deep fascia in midline over the Small Saphenous Vein and Medial Sural Cutaneous Nerve to their exit and reflect the flaps laterally.
- ☐ 7. Identify the distal portion of the Posterior Femoral Cutaneous Nerve and uncover the proximal portions of the Small Saphenous Vein and the Medial Sural Cutaneous Nerve; also the Lateral Sural Cutaneous and Anastomotic Peroneal Nerves.
- ☐ 8. Clean and review the boundaries of the Popliteal Fossa and continue the dissection upward to isolate carefully the long head of the Biceps Femoris, and the Semitendinosus.
- ☐ 9. Cut the long head of the Biceps Femoris at its center and expose the course of the Sciatic Nerve to the Popliteal Fossa. Note the level of its division into Tibial and Peroneal Nerves.
- ☐ 10. Identify its branches to the long head of the Biceps Femoris, the Semitendinosus, Semimembranosus and Adductor Magnus. At a lower level, identify the branch to the short head of the Biceps Femoris.
- ☐ 11. Carefully isolate the Semimembranosus; then cut the Semitendinosus (with upper part of the Biceps) and the Semimembranosus near their origin on the Ischium.
- ☐ 12. Locate the Perforating Arteries II, III, and IV of the Deep Femoral, and trace their anastomoses.
- ☐ 13. Expose the passage of the Femoral vessels through the tendinous arch of the Adductor Magnus\* and follow them with the Tibial and Peroneal divisions of the Sciatic Nerve, to the Popliteal Fossa, cleaning away fat and areolar tissue.
- ☐ 14. Follow the Common Peroneal Nerve, exposing the origins of the Lateral Sural Cutaneous and Anastomotic Nerves, and of its two Articular branches, Superior Lateral Articular and Inferior Lateral Articular Nerves. Continue tracing the Common Peroneal Nerve to the lateral margin of this space.
- ☐ 15. Similarly, follow the Tibial Nerve exposing the origins of the medial articular branches, Superior, Middle and Inferior, of the Medial Sural Cutaneous Nerve, and of the muscular rami (usually five) supplying the two heads of the Gastrocnemius, Plantaris, Soleus and Popliteus.

\* Note whether an Articular branch of the Obturator Nerve accompanies these vessels, and if so include it in the dissection.



## 532 POSTERIOR THIGH AND POPLITEAL SPACE

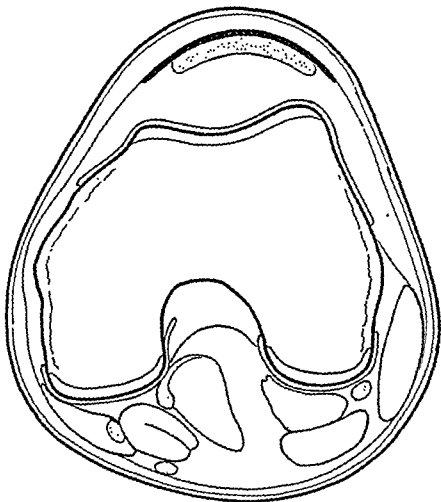
- ☐ 16. Identify the drainage point of the Small Saphenous Vein; then without injuring the Genicular vessels, proceed to clean the Fossa in order to expose completely the Popliteal Artery and Vein between the heads of the Gastrocnemius.

Note whether an anastomotic venous branch is present connecting the Small Saphenous with the Deep Femoral Vein.

- ☐ 17. Follow the Superior Genicular Vessels and corresponding Articular Nerve to each side lifting the hamstring muscles to expose their course. Note their position to the epicondyles.
- ☐ 18. For wider exposure cut the heads of the Gastrocnemius at the level of their union and reflect upward. Identify the Middle Genicular Vessels and trace them to their entrance through the Oblique Ligament of the knee to supply the Cruciate Ligaments and adjacent tissue. Note presence of the articular branch of the Obturator Nerve.
- ☐ 19. Follow the course of the Lateral Inferior Genicular Vessels and Articular Nerve passing under the Plantaris to beneath the tendon of the Biceps and proximal to the head of the Fibula; and the Medial Inferior Genicular Vessels and Articular Nerve along the upper border of the Popliteus. Both run under the Collateral Ligaments of the Knee.
- ☐ 20. Identify on the anterior surface of the Knee the anastomotic connections between the Superior and Inferior Genicular Arteries, also the contribution of the Highest Genicular Artery from the Femoral to these anastomoses.
- ☐ 21. Cleanly isolate the insertions of the thigh muscles below the Knee for review and study of the ligaments.
- ☐ 22. Split the Quadriceps and Patella tendons and saw the Patella in midline. Identify the extent of the deep Suprapatellar Bursa; note if it communicates with the joint cavity. Also identify the deep Infrapatellar Bursa beneath the Patella tendon.
- ☐ 23. Separate the two halves of the Patella widely and flex the knee to expose the interior of the Knee Joint and its structures:
- |                        |                   |
|------------------------|-------------------|
| Infrapatellar Pad      | Crucial Ligaments |
| Patellar Synovial Fold | Menisci           |
| Plicae Alares          |                   |
- ☐ 24. Review and make a sketch of all arterial anastomoses about the Hip.

Review the Knee Joint and its ligaments, also the Tibia and Fibula.

Review all muscles of the Thigh and Knee, their nerve supply, actions and morphology.



CROSS SECTION SLIGHTLY ABOVE RIGHT KNEE JOINT

Identify the following—

Sartorius  
Gracilis tendon  
Semimembranosus  
Semitendinosus tendon  
Gastrocnemius (2 heads)

Plantaris  
Biceps  
Patella tendon  
Fibular Collateral Ligament

Locate and label the following—

*Arteries*

Popliteal

*Veins*

Great Saphenous  
Popliteal  
Small Saphenous

*Nerves*

Saphenous  
Posterior Femoral Cutaneous  
Common Peroneal  
Tibial

Prepatellar Bursa



LVIII  
ANTERIOR LEG AND FOOT

A. TOPIC FOR DISCUSSION. Paralytic and Congenital Disorders of the Feet.

B. SPECIAL STUDY

*Nerves:*

Saphenus

Cutaneus dorsalis lateralis pedis

Peroneus communis

Peroneus superficialis

Rami musculares (Peroneal)

Cutaneus dorsalis medialis pedis

Cutaneus dorsalis intermedius pedis

Peroneus profundus

Rami musculares

*Arteries:*

Tibialis anterior and branches

Dorsalis pedis

Arcuata pedis

Peronea perforans

*Veins:*

Saphena magna

Saphena parva

Arcus venosus dorsalis pedis

C. DIRECTIONS FOR DISSECTION AND STUDY

- ☐ 1. Make a midline skin incision to the base of the middle toe; a transverse incision across the base of the toes; and an oblique incision from the front of the ankle to each side of the heel. Also make a medial incision on the dorsum of each digit.
- ☐ 2. Dissect the skin toward each side as far as the posterior aspect of the leg, and to the margins of the sole of the foot.
- ☐ 3. Expose in the superficial fascia, the course of the Great Saphenous Vein and the accompanying Saphenous Nerve, from the medial side of the knee to the ankle. There the main channel of the Veins continues as the Dorsal Venous Arch of the Foot. Note the position of the Vein to the Internal Malleolus, and its branches to the sole.

- ☐ 4. Trace the lateral side of the Venous Arch to the ankle whence it swings posteriorly as the Small Saphenous Vein seen in the previous dissection. Note its position to the External Malleolus.
- ☐ 5. Observe the digital branches of the Venous Arch to the toes, and an anastomotic branch to deep veins, dipping between the first and second metatarsal bones. At that point identify the terminal superficial branch of the Deep Peroneal Nerve which makes its exit and trace to the adjacent sides of Digits I and II.
- ☐ 6. Locate the exit of the Superficial Peroneal Nerve through deep fascia in the lower third of the leg between the Extensor tendons and the Fibula. Trace its Medial Dorsal Cutaneous branches to the medial side of Digit I and to the adjacent sides of Digits II and III. Trace its Intermediate Dorsal Cutaneous branches to the adjacent sides of Digits III and IV, and of Digits IV and V.
- ☐ 7. Locate the Lateral Dorsal Cutaneous Nerve along the lateral side of Digit V and trace it behind the External Malleolus. It is the terminal branch of the Sural Nerve formed by the union of the Medial Sural Cutaneous branch of the Tibial Nerve, with the Anastomotic branch from the Common Peroneal Nerve seen in the previous dissection.

Try to identify communicating branches between these cutaneous nerves to the digits.
- ☐ 8. Remove the superficial fascia from the front and sides of the leg and dorsum of the foot, preserving the main branches of the Cutaneous Nerves.
- ☐ 9. Incise the deep fascia along the lateral edge of the Tibia as far as the Annular (Transverse) Ligament, then laterally to the Fibula. Reflect the deep fascia to the side to uncover the Extensor and Peroneal groups of muscles, as far as the Posterior Peroneal Septum. Note the strong septum between the Extensor and Peroneal groups.
- ☐ 10. Trace the deeper course of the Superficial Peroneal Nerve from its origin on the Common Peroneal, identifying its branches to the Peroneus Longus and Brevis.
- ☐ 11. Carefully isolate and separate the Tibialis Anterior from the Long Extensors. Cut the former at its origin and reflect to locate the Anterior Tibial Artery, the accompanying Vein, and the Deep Peroneal Nerve lying on the Interosseous Membrane.
- ☐ 12. Extend the dissection upward to identify the origin and course of the Anterior Recurrent Tibial Artery and its anastomosis with the Lateral Inferior Genicular Artery.

- ☐ 13. Identify branches of the Deep Peroneal Nerve to the Tibialis Anterior, to the Long Extensors of the Digits and Hallux, and to the Peroneus Tertius. Divide the Peroneus Longus and Extensor Digitorum Longus near their origin to trace the Nerve to its origin from the Common Peroneal.
- ☐ 14. Locate deeply the posterior passage of the Anterior Tibial Artery and Vein over the proximal margin of the Interosseous Membrane.
- ☐ 15. Distally, review the Transverse and Cruciate Ligaments and Tendon Sheaths, then cut the ligaments on the medial side and reflect to isolate the tendons.
- ☐ 16. Expose the lower portion of the Anterior Tibial Artery and its continuation as the Dorsalis Pedis. Identify and trace its Medial and Lateral Anterior Malleolar branches. Identify the exact position of the Dorsalis Pedis Artery to the tendons. Where can its pulsations be felt?
- ☐ 17. Locate the Perforating Branch of the Peroneal Artery piercing the lower part of the Interosseous Membrane and trace it to the lateral side of the ankle where it anastomoses with the Lateral Anterior Malleolar Artery.
- ☐ 18. Lift the Long Extensor tendons to clean and isolate the Extensor Digitorum Brevis. Identify its innervation by a branch from the Deep Peroneal Nerve. Follow the Nerve to its superficial terminal branch to Digits I and II.
- ☐ 19. Follow the Dorsalis Pedis Artery to the first Intermetatarsal Space, identifying its Lateral Tarsal and Arcuate Arteries; also the four Deep Plantar branches, dipping plantarly to join the Plantar Arch in the sole of the foot. The First Deep Plantar branch is a direct continuation of the Dorsal Pedal Artery, the other three are branches of the Arcuate Artery.
- ☐ 20. Identify the origins and course of the Dorsal Metatarsal Arteries and their digital branches to the adjacent sides of the toes.

Make a sketch to show the Arterial Anastomoses about the Knee.

Sketch the Sensation Areas in anterior and posterior aspects of the leg and foot; also indicate the positions and course of the Cutaneous Nerves in relation to those areas.

Review the Talus and its articulations.

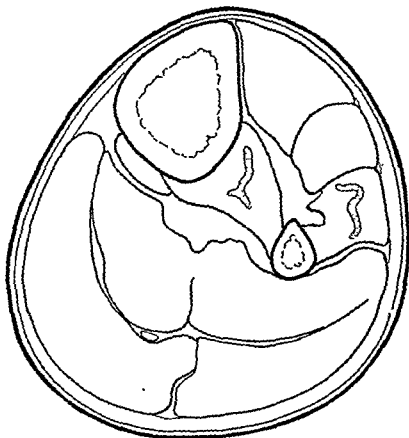
- ☐ 6. Reflect the belly of the Gastrocnemius and identify the innervation of the Soleus muscle from the Tibial Nerve; also expose the course of the Tibial Vessels and Nerve into the tendinous arch between the tibial and fibular origins of the Soleus.
- ☐ 7. Isolate the Plantaris muscle and tendon noting its nerve supply from the Tibial Nerve.
- ☐ 8. Starting on the medial side of the tendinous arch, cut the tibial origin of the Soleus and reflect it laterally noting the various points of its arterial blood supply.
- ☐ 9. Observe the continuity of deep fascia previously exposed as it covers the upper parts of the flexor muscles. It contains the deep posterior vessels and nerves of the leg. Split this fascia and reflect.
- ☐ 10. Behind the Internal Malleolus identify the Tibial Nerve and the Posterior Tibial vessels lying between the Flexor Digitorum Longus on the tibial side, and the Flexor Hallucis Longus on the fibular side.
- ☐ 11. Clean away areolar tissue as these vessels and nerve are traced upward toward the knee. Identify the branches of the Tibial Nerve and Artery to the two flexor muscles and to the Tibialis Posterior.
- ☐ 12. Locate the bifurcation of the Popliteal Artery at the lower border of the Popliteus muscle, into Anterior and Posterior Tibial Arteries.
- ☐ 13. Expose the forward (deep) course of the Anterior Tibial over the superior margin of the Interosseous membrane; a Posterior Tibial Recurrent Artery is sometimes given off from the Anterior Tibial, immediately before its passage forward between the two leg bones.
- ☐ 14. After carefully isolating the two flexor muscles, trace the Peroneal Artery from its origin on the Posterior Tibial, following it beneath the Flexor Hallucis Longus to emerge posteriorly to the lower end of the Fibula. From there it continues to the lateral side of the heel as the Lateral Calcaneal Artery. Note the muscular branches to the adjacent muscles.
- ☐ 15. Identify the origin of the Perforating branch of the Peroneal Artery which was seen piercing the Interosseous Membrane in the previous dissection.
- ☐ 16. Locate the Nutrient Artery to the Tibia supplied by the Posterior Tibial; also the Nutrient Artery to the Fibula, from the Peroneal Artery.
- ☐ 17. Isolate the Tibialis Posterior muscle sufficiently for review. Study the relative positions of the tendons behind the Internal and the External Malleoli.

On the cross-section sketches of the leg, identify the Fascial Compartments and the principal structures, superficial and deep.

Sketch the arterial anastomoses about the Ankle.

Read up and briefly describe the Lymphatics of the Lower Extremity.





CROSS SECTION AT JUNCTURE OF UPPER AND MIDDLE THIRDS OF RIGHT LEG

Identify the following—

Tibialis Anterior  
Extensor Digitorum Communis  
Peroneus Brevis and Longus  
Tibialis Posterior

Popliteus  
Soleus  
Plantaris tendon  
Gastrocnemius

Locate and label the following—

*Arteries*

Anterior Tibial  
Posterior Tibial  
Peroneal

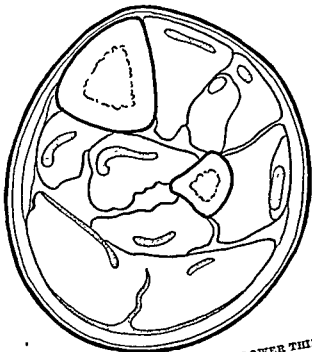
*Nerves*

Saphenous  
Peroneal Anastomotic  
Medial Sural  
Superficial Peroneal  
Deep Peroneal  
Tibial

*Veins*

Great Saphenous  
Small Saphenous  
Anterior Tibial  
Posterior Tibial  
Peroneal

Interosseous Membrane



CROSS SECTION AT JUNCTURE OF MIDDLE AND LOWER THIRDS OF RIGHT LEG

Identify the following—

- Tibialis Anterior
- Extensor Digitorum Communis
- Extensor Hallucis Longus
- Peroneus Longus tendon
- Peroneus Brevis

Locate and label the following—

- Arteries*
- Anterior Tibial
- Posterior Tibial
- Peroneal

- Veins*
- Great Saphenous
- Small Saphenous
- Anterior Tibial
- Posterior Tibial
- Peroneal

- Flexor Digitorum Longus
- Flexor Hallucis Longus
- Tibialis Posterior
- Gastrocnemius and Soleus

- Nerves*
- Saphenous
- Superficial Peroneal
- Sural
- Deep Peroneal
- Tibial

- Interosseous Membrane
- Anterior Intermuscular Septum
- Posterior Intermuscular Septum



L X  
FOOT (COMPLETED)

A. TOPIC FOR DISCUSSION. Disorders of the Foot.

B. SPECIAL STUDY

*Nerves:*

Plantaris medialis  
Plantaris lateralis

*Arteries:*

Plantaris medialis  
Plantaris lateralis  
Arcus plantaris  
Ramus profundus (Dorsalis Pedis)

*Veins:*

Plantaris medialis  
Plantaris lateralis

C. DIRECTIONS FOR DISSECTION AND STUDY

- ☐ 1. Note the relative lengths of the first and second toes, also the presence of callous areas on the ball of the foot.  
Make a midline incision from the heel to the base of the middle toe, a transverse incision across the sole at that level, and a midline incision to the tip of each toe.
- ☐ 2. Remove the skin toward each side noting its strong attachment by numerous fibrous strands extending deeply to the Plantar Aponeurosis.
- ☐ 3. Cut the Lacinate Ligament in order to trace the Medial Calcaneal Nerve from its origin on the Tibial Nerve to its distribution on the sole.
- ☐ 4. Incise the superficial fascia in midline and proceed with its removal toward each border of the sole. Use increasing care as the fore part of the foot is approached in order not to injure the digital vessels and nerves which become superficial between the divisions of the Aponeurosis.
- ☐ 5. Observe how each side of the middle portion of the Plantar Aponeurosis dips deeply for bony attachment, and identify the exit of superficial vessels and nerves (Lateral and Medial Plantar branches) from the grooves so formed. Note the position and strength of Transverse Fasciculi.



- ☐ 6. Anterior to the heads of the Metatarsal bones and crossing above the digital vessels, identify and expose in the superficial fascia the **Superficial Transverse Ligament**. Observe its relation to the base of the toes, and in particular, to the Great Toe.
- ☐ 7. Identify the muscles of the foot covered by the three portions of **Plantar Aponeurosis**, **Lateral**, **Intermediate** and **Medial**. In the subsequent dissection observe that the **Aponeurosis** serves as part of their origins.
- ☐ 8. Starting at the heel, lift the **Lateral** portion; carry the dissection on the side of the foot to remove the **Superior** and **Inferior Retinaculum** and expose the tendons of the **Peroneal** muscles.
- ☐ 9. Similarly, remove the **Medial** portion of the **Aponeurosis** and adjacent parts of the **Laciniate Ligament** to expose the course of the **Posterior Tibial Vessels** and the division of the **Tibial Nerve** into **Medial** and **Lateral Plantar Nerves**. Also uncover the tendons of the **Flexor Digitorum Longus**, **Tibialis Posterior**, and **Flexor Hallucis Longus**.
- ☐ 10. Cut the **Intermediate** portion of the **Aponeurosis** near the **Calcaneum** and dissect it from the underlying **Flexor Digitorum Brevis**, to its distal metatarsal attachments.
- ☐ 11. Cut the **Abductor Hallucis** near its origin and reflect to follow the division of the **Tibial** vessels into **Medial** and **Lateral Plantar Arteries** and **Veins**. Observe the blood and nerve supply of the **Abductor Hallucis**.
- ☐ 12. Trace the **Medial Plantar Artery** and **Nerve** forward on the **Flexor Hallucis Brevis** to the medial side of **Digit I** noting their branches to this muscle.
- ☐ 13. Cut the **Flexor Digitorum Brevis** at its origin and lift distally. Trace the branches of the **Medial Plantar Nerve** to the adjacent sides of **Digits I** and **II**, **II** and **III**, and **III** and **IV**. Try to locate the innervation of the **First Lumbrical** muscles from the most medial of these three branches.
- ☐ 14. Trace the **Lateral Plantar Vessels** and **Nerve** across the surface of the **Quadratus Plantae\***; observe the division of the **Nerve** into **Superficial** and **Deep** branches.
- ☐ 15. Identify the deep continuation of the **Lateral Plantar Artery** to join the outer side of the **Plantar Arch** after giving off a superficial branch for the lateral side of **Digit V**.

\* Note whether this muscle, or either one of its two heads, is absent.

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- ☐ 16. Trace the Digital branch of the Lateral Plantar Artery and the accompanying Nerve to the outer side of Digit V; try to identify its small muscular branches to the Flexor Digiti Quinti Brevis and to the Interossei of the fourth Intermetatarsal Space. Also follow the more medial superficial branch of the Lateral Plantar Nerve to the adjacent sides of Digits IV and V.
- ☐ 17. Cut the Abductor Digiti Quinti from its origin and expose the passage of the Peroneus Longus tendon to the sole of the foot. Review the short and long flexors of the toes, also the Lumbricales, exposing their course and insertions.
- ☐ 18. Cut the Quadratus Plantae near its origins and the Flexor Digitorum Longus near the ankle, then reflect them forward noting any union between the Flexor Digitorum and the Flexor Hallucis Longus. Cut the tendon of the latter muscle where it passes into the foot; and in reflecting forward identify the innervation of the three lateral Lumbricales from the Lateral Plantar Nerve.
- ☐ 19. Clean and review the two parts of the Adductor Hallucis and the Flexor Hallucis Brevis.
- ☐ 20. Trace the deep part of the Lateral Plantar Vessels and Nerve to the border of the oblique head of the Adductor Hallucis; cut this muscle near its origin and reflect forward.
- ☐ 21. Identify the innervation of the two heads of the Adductor and the Interossei of the first, second and third Intermetatarsal Spaces from this deep part of the Lateral Plantar Nerve.
- ☐ 22. Follow the course of the Plantar Arterial Arch and identify its medial termination in the Plantar branch of the Dorsalis Pedis Artery which enters the sole from the dorsum of the foot through the first Intermetatarsal Space.
- ☐ 23. Divide the Flexor Hallucis Brevis and Adductor Hallucis to trace the Plantar Metatarsal Arteries to their Digital branches which supply the adjacent sides of Digits I and II, II and III, III and IV, IV and V.
- ☐ 24. Expose the course of the tendon of the Peroneus Longus, identifying the structures forming and covering its channel.
- ☐ 25. Review the Interossei Muscles and note how their arrangement differs from that in the hand. Identify their innervation.
- ☐ 26. Disarticulate the first Metatarsal bone to trace the deep branch of the Dorsalis Pedis Artery to the Plantar Arch.



List all the muscles of the leg and foot, according to their Nerve Supply. Review their actions and morphology, including tendon sheaths.

Review the bones and joints of the Foot.



